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INDIANA UNIVERSITY

An Analysis of Arithmetic Textbooks (Fifth Period—1911 to 1940)

by

HENRY LESTER SMITH
and
MERRILL THOMAS EATON

A List of Bulletins in the Field of Education, Indiana University

by

KATHLEEN DUGDALE

Published by the
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Indiana University

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H.L.S. and M.T.E.

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An Analysis of Arithmetic Textbooks (Fifth Period—1911 to 1940)

H. L. SMITH and M. T. EATON

INTRODUCTION

THIS bulletin comprises the fifth part of an analysis of the content of representative arithmetic textbooks covering a period of more than 200 years.

The earliest of the texts analyzed was published in 1706, but no other arithmetics published before 1790 were available for this study. The period from 1790 to 1940 was divided into five periods of 30 years each, and the books selected from each period were analyzed in the same manner, so that information from each period could be studied in its relationship to the information from books of any of the other four periods.

The analyses of arithmetic textbooks representing the first four periods have already been published as numbers of the *Bulletin of the School of Education*. The present study covers the texts of the final 30-year period included in the investigation. A later bulletin, however, will present developments and trends that have taken place through the entire 150-year period, bringing out the likenesses and differences, the developments and trends.

GENERAL DESCRIPTION OF THE TEXTBOOKS USED

The texts selected as representative of the arithmetics used from 1911 to 1940 are all of them published in more than one volume, the separate volumes being designed specifically for certain grades. To make their analysis comparable to that of textbooks published in one volume, each series in this period is handled as a unit, since it takes all volumes in a series to present the material for all elementary grades. A list of the ten series* included in this period follows:

50. *Modern Arithmetic.* By Henry C. Cox, George A. Tallant, and Frederick H. Umholtz. Lyons and Carnahan, Chicago, 1913. Vol. I, grades 1-4; Vol. II, grades 5-8.
51. *Everyday Arithmetic.* By Franklin S. Hoyt and Harriet E. Peet. Houghton Mifflin Co., Boston, 1915. Vol. I, grades 3-4; Vol. II, grades 5-6; Vol. III, grades 7-8.
52. *School Arithmetics.* By George Wentworth and David Eugene Smith. Ginn and Co., Boston, 1919, 1920. Vol. I, grades 1-4; Vol. II, grades 5-6; Vol. III, grades 7-8.
53. *Progressive Arithmetics.* By David Eugene Smith. Ginn and Co., Boston, 1924. Primary book, grades 1-4; Intermediate book, grades 5-6; Advanced book, grades 7-8.

* The textbooks are numbered consecutively through the entire study. The first 49 books have been analyzed and reported in earlier bulletins.

54. *Modern Life Arithmetics.* By John Guy Fowlkes and Thomas Theodore Goff. The Macmillan Co., New York, 1928. Book I, grades 3-4; Book II, grades 5-6; Book III, grades 7-8.
55. *Triangle Arithmetics.* By Leo J. Brueckner, C. J. Anderson, G. O. Banting, and Elda L. Merton. The John C. Winston Co., Philadelphia, 1928. Vol. I, grades 3-4; Vol. II, grades 5-6; Vol. III, grades 7-8.
56. *Iroquois Arithmetics.* By Harry DeW. DeGroat, Sidney G. Firman, and William A. Smith. Iroquois Publishing Co., Inc., Syracuse, N.Y., 1932. Book I, grades 3-4; Book II, grades 5-6; Book III, grades 7-8.
57. *Child-Life Arithmetics.* By Clifford Woody, Frederick S. Breed, and James R. Overman. Lyons and Carnahan, Chicago, 1936, 1937. Vol. I, grade 3; Vol. II, grade 4; Vol. III, grade 5; Vol. IV, grade 6; Vol. V, grade 7; Vol. VI, grade 8.
58. *Daily Life Arithmetics.* By Guy T. Buswell, William A. Brownell, and Lenore John. Ginn and Co., Boston, 1938. Vol. I, grade 3; Vol. II, grade 4; Vol. III, grade 5; Vol. IV, grade 6; Vol. V, grade 7; Vol. VI, grade 8.
59. *Study Arithmetics.* By F. B. Knight, G. M. Ruch, J. W. Studebaker, and W. C. Findley. Scott Foresman and Co., Chicago, 1934-1942. Vol. I, grade 3; Vol. II, grade 4; Vol. III, grade 5; Vol. IV, grade 6; Vol. V, grade 7; Vol. VI, grade 8.

While most of the arithmetics listed here are familiar to teachers today, their general characteristics should be noted.

The *Modern Arithmetic* series contains only two volumes, the first being designed for grades 1 to 4 and the second for grades 5 to 8. The elementary text was written by Henry Cox alone, while the advanced text was written by all three authors.

In the preface of the first volume Cox points out that the books have been prepared so that (1) "the pupil shall acquire the ability to add, subtract, multiply, and divide numbers rapidly and accurately," and (2) "the pupils shall acquire the ability to visualize, or to concrete, number problems for themselves." He suggests that the teacher supply the pupils with sticks, blocks, beans, toothpicks, gum wads, or any other object to inspire self-activity and permanently fix number facts in their minds.

Rules of operation are used only when they are obviously needed, which is but seldom. Many drill exercises are given in the first volume, and the second contains graded exercises for both oral and written practice and problems from everyday life. No problems are included which involve algebra, alligation, foreign money, metric system, or progression.

The elementary text contains 272 numbered pages, including a good many illustrations. The advanced book is larger, containing 424 numbered pages, but it has very few illustrations. Both books are bound in heavy brown cloth, with printed pages about 4 by 6 inches. The elementary test contains approximately 165 six-letter words to the page, but the advanced book is in smaller type. Through oversight the 400-word pages in both books have been figured on the basis of 165 words to the page in this study.

The authors of the *Everyday Arithmetic* series state that "the problems and exercises are grouped by situations taken from actual experience, so that a child meets number vitally related to his home and school interests. The fundamental facts and tables are taught through games and plays," the fundamental processes largely through a series of projects in buying and selling and through measuring as used in construction work. The advantages of this grouping are claimed to be threefold: "It gives a child insight into the purpose of number work and wins his hearty cooperation; it breaks down the artificial barrier between arithmetic that is taught in the schoolroom and that which a child meets in his outside experience, so that the two become interwoven and both are enriched; further, it gives a child that which is of prime importance, power to use the number processes under conditions similar to those that confront him in life."

Volume II is designed to complete "the study of the essential processes in arithmetic. . . . In this book, although many of these immediate interests are still appealed to, there is a reaching out to the larger interests of the community, corresponding to the expansion of a child's point of view."

In the second volume the authors state that they have taken into account individual differences in ability and have kept in mind the special needs of those children who have to leave school at the end of the sixth grade. Problems in wage-earning, in the use of money, and in everyday transactions are included, these problems involving the essential processes of simple arithmetic.

Few illustrations are used in these books. No mention is made of alligation, analysis, arithmetic, cancellation, imports and exports, partnership, or progression.

Each of the volumes is designed for two grades and the pages of the two parts are numbered separately. The first and second volumes contain 280 numbered pages each and the third contains 328 pages, each page containing about 4 by 6 inches of printed matter. Although the type is larger in Volume I than in either of the others, and therefore there are somewhat fewer words to the page, there are approximately 263 six-letter words to the page in the three volumes. All of the books have a brown heavy cloth binding.

The authors of the *School Arithmetics* series state that in these books they have endeavored "to balance adequately the abstract and the concrete, the drill work and the applied problems, the review work and the new material." They have attempted to prepare a book presenting in an interesting manner the essentials of arithmetic required in the lower elementary grades. In the third volume the authors state that "a textbook should be the servant of the teacher, not the master, and under each topic the teacher should choose only such exercises and as many of them as are necessary to secure good work on the part of the pupil."

Few illustrations are used in these books. Footnotes and notes to teachers are used frequently throughout the books. At the end of each book two pages are given to suggestions to teachers.

Volume I contains 282 numbered pages, the printed matter cover-

ing 4 by 5½ inches of space. The printed matter in the other two books covers a space 4 by 5¾ inches in size, Volume II containing 298 numbered pages and Volume III containing 346 pages. Although the print in the book for the primary grades is larger than that in the other two books, each of the three contains approximately 186 six-letter words to the page. The books are bound in grey heavy cloth.

Although this series was published in 1919 and 1920, the latter date is used in this study because the copy used for analysis is the 1920 edition.

The preface and suggestions to teachers in the *Progressive Arithmetics* series are practically the same as those in the preceding series, as Smith was a co-author of the earlier series. Smith suggests that the teacher put forth every effort to make the subject seem real to the pupil, that she reduce the number of problems that relate to city life if she is teaching in rural schools or reduce the number of problems relating to farming if she is in a city system, and that she have the pupils stay with a subject long enough to acquire a feeling of mastery.

This series contains very few definitions or rules and explanations, as Smith felt that the aim of arithmetic is to teach the pupil to compute rather than to memorize reasons or waste time on definitions. Simplicity of language is stressed for "the time has come when many of our difficult terms should disappear." However, notes and suggestions to teachers are used frequently.

The first two books in this series have 266 numbered pages to the book and the last one has 314 pages. All three contain an average of 243 six-letter words to the page, the printed page measuring approximately 4 by 5¾ inches. The books are bound in light blue heavy cloth.

The material used by Fowlkes and Goff in their *Modern Life Arithmetics* series appeared first in experimental editions that were used in 20 states and were criticized by administrative officers, teachers, and children. After these criticisms were taken into consideration, the final form of the books was published.

The authors of this series agree with Smith on the need for a more simple vocabulary in arithmetic textbooks. They attempt to take problems from the daily conversations of children and to state them in terms familiar to children of the age for which the texts are intended. An unusually large proportion of the book is given to questions. A great many illustrations are included, too, both in color and in black and white.

The three volumes contain 435, 402, and 445 numbered pages, respectively, each printed page being approximately 4 by 6½ inches in size and containing 211 six-letter words. The books are bound in a light tan heavy cloth.

The *Triangle Arithmetics* series claims to be based on the results of "scientific investigations of curriculum-making, of the learning process, and of the psychological analysis of the steps in the various processes in computation." This is the first scientific attempt, so far

as the textbooks analyzed are concerned, to present material in a form consistent with the psychological findings of the day.

In order to make the problems real, data have been secured from government reports, geography textbooks, the *World Almanac*, farm bulletins, special studies by scientists, reports of manufacturers, and city, state, and national budgets. The authors believe that "the materials used, the procedures suggested, and the collateral information presented in these books will result in specific mathematical habits and skills, the acquisition of socially valuable quantitative knowledge, and desirable general patterns of conduct." These, they believe, are the essential outcomes of arithmetic.

The first book in the series contains 519 numbered pages, the second, 495, and the third, 516. Each book is designed for two grades, the first part of the book being for the lower grade and the second part for the upper grade. The two parts are paged separately. The printed page contains approximately 231 six-letter words and is 4 by 6 inches in size. The books are bound in light blue heavy cloth.

According to the publishers of the *Iroquois Arithmetics* series, the authors have presented a very definite plan for problem solving, and believe that a carefully thought-out method of attacking problems should be constantly presented to the pupil so that logical thinking will be continuously and consistently developed. An attempt has been made to create in the pupil a desire to use numbers and then to supply the means of satisfying that desire. Drill is given after each process to insure retention of the process. Review features are introduced in new settings, avoiding a monotony of review. It is stated that, by using the drills and tests at frequent intervals, the teacher and pupil can measure the progress made.

An attempt is made to use a vocabulary thoroughly understandable to children of the age for which the texts are designed. A number of illustrations are used, but always with a purpose.

These books contain 358, 373, and 390 numbered pages, respectively. The printed matter covers 4 by 6⅛ inches of space and contains about 191 six-letter words per page. The books are bound in bright red heavy cloth.

The *Child-Life Arithmetics series*, the authors state, is "based on a scientific analysis of the psychological processes of the child and of the mathematical processes of the subject." They possess "such good features as page unity, numerous and interesting illustrations, elimination of unnecessary technical terms and careful explanations and illustrations of those used, and the introduction of new processes in social situations familiar to children."

"One of the major objectives of this series of books is the development and maintenance of skill in the fundamentals. . . . Waste of time in practicing on a process already mastered is avoided by a series of diagnostic and remedial exercises."

Wherever possible, the pupil is encouraged to discover methods of procedure for himself. The authors believe that this insures a better understanding and greater self-confidence and interest on the

part of the pupil. Throughout the books, definitions, rules, and tables are boxed.

Problems in the first four volumes deal with everyday experiences of children; those in the last two volumes are designed to help prepare the child for the activities of an adult world. Illustrations and pictures in the arithmetics for grades 3 through 6 are brightly colored, while those in volumes for grades 7 and 8 are in black and white.

This is the first of the various series to contain six separate volumes, one for each grade from the third through the eighth, and is also the first to have pictures on the cover. These books contain 242, 237, 280, 293, 290, and 273 pages, respectively. The printed page is about 4 by 6 inches in size and contains 165 words. The volumes for the seventh and eighth grades are printed in slightly smaller type than are the others. All six volumes are bound in bright red cloth.

In the *Daily Life Arithmetics* series, the authors state that arithmetic should be taught with understanding, meaning, and insight as a goal rather than drill, speed, and mechanical skill. "The instructional program is then designed so that children will both understand arithmetic as arithmetic (the mathematical aim) and appreciate its practical values in their lives (the social aim)."

The authors have given considerable space to the number system, to the logic of processes and of computation, and to the development of rich meaningful quantitative concepts. They also illustrate in ways of interest to children some of the many uses of number in the ordinary course of their lives.

Attention is paid in these books to the problem of individual differences. The authors have provided special work for pupils who learn faster and a great deal of special help for those who learn more slowly.

Interesting features found in the sixth book of the series include two pages of optical or geometrical illusions and one page given to old puzzle problems, like those found in the early arithmetic texts; for example, "A man was traveling with a wolf, a goat, and a basket of cabbages. He could not leave the wolf alone with the goat nor the goat alone with the cabbages. Soon they came to a river, and the only means of crossing was a boat so small that the man could take only one thing across at a time. How did he manage it so as not to leave the wolf and the goat together or the goat and the cabbages together?"

Throughout the series more pictures are used than in any of the other series included in this period. Volume I has 322 numbered pages, Volume II has 318, Volumes III and V have 310 each, and Volumes IV and VI have 326 each. The page contains approximately 4 by 6½ inches of printed matter and about 203 six-letter words. Each of the six books has a picture on the cover and is bound in a different color of cloth binding, including orange, brown, dark green, light green, red, and blue. This is the first of the various series to have the separate volumes bound differently.

In the *Study Arithmetics* series, the authors were not exactly the

same throughout the six volumes—all four authors worked on the first two volumes, but only Knight, Studebaker, and Ruch were the authors of the last four volumes. The first of the volumes was published in 1934, 1940; the second and third in 1935, 1940; the fourth in 1936, 1940; and the fifth and sixth in 1937, 1942. Since the first edition of all of these volumes fell within the 30-year period being studied and the final edition of four of the six volumes was published in 1940, the year 1940 is considered as the publication date of this series.

The *Study Arithmetics* series is a revision of the *Standard Service Arithmetics*, which were revised "to meet the insistent demands of educators for an upward shifting in the grade placement of certain topics. . . . "

In the preface the statement is made that "the traditional arithmetic textbook was developed as a reference manual rather than as a learning tool for pupils. Children were taught by the teacher; they could not learn from the book. It is only within recent years that arithmetics have been specifically designed for pupil learning."

An attempt is made to use simple language and sentence structure throughout the books and to give ample treatment to new topics. More written and drill problems are included in this series than in any of the others studied in the 30-year period from 1911 to 1940. The last pages in each volume are given over to self-help practice and diagnostic tests and progress charts for self-testing drills.

The books designed for the upper grades contain more numbered pages than do those for the lower grades. Volume I contains 336 pages; Volume II and III, 352 each; Volume IV, 384; Volume V, 480; and Volume VI, 512. Each page contains approximately 158 six-letter words. The printed matter covers approximately 4 by 5¾ inches of space per page. The books are bound in brown cloth bindings, with drawings on the front covers.

TECHNIQUE OF PROCEDURE

The representative arithmetics published during the fifth period have been handled in the same way as have those of the four earlier periods. The introductions and prefaces have been studied carefully with a view to determining the theories, purposes, and proposed teaching techniques set forth by the authors of the various series.

The amount of space given to different arithmetic topics, to the various types of content, and to the different problem subjects mentioned has been measured in each series. This has been done in terms of hundredths of a page given to each item. Since the various series do not have the same size of print or of page, the measured space is not comparable unless stated in terms of some standard measure. Therefore the 400-word page has been used and all measurements of actual pages are computed according to that standard.

RESULTS OF THE ANALYSIS

Space given to each topic.—Table I gives the number of standard 400-word (six-letter) pages in the arithmetics, classified according

TABLE I. NUMBER OF 400-WORD PAGES GIVEN TO EACH TOPIC IN ARITHMETIC TEXTBOOKS FROM 1911 TO 1940

Topic	Modern Arithmetic series, 1913	Everyday Arithmetic series, 1915	School Arithmetics series, 1920	Progressive Arithmetics series, 1924	Modern Life Arithmetics series, 1928	Triangle Arithmetics series, 1928	Iroquois Arithmetics series, 1932	Child Life Arithmetics series, 1937	Daily Life Arithmetics series, 1938	Study Arithmetics series, 1940	Total pages
	50	51	52	53	54	55	56	57	58	59	
Algebra	0	5.65	.88	1.15	7.66	6.03	9.07	0	14.13	9.68	54.25
Aliquot parts	.12	1.94	2.31	0	1.61	0	0	0	0	0	5.98
Alligation	0	0	0	0	0	0	0	0	0	0	0
Analysis	3.51	0	0	0	0	0	0	0	0	0	3.51
Arithmetic	.41	0	0	0	.68	0	0	2.04	11.49	0	14.62
Bills and accounts	2.64	20.91	8.67	4.01	21.72	18.54	6.70	14.44	7.89	20.97	126.49
Bonds	1.18	2.63	0	1.34	2.29	2.14	1.39	2.87	1.45	2.07	17.36
Cancellation	.23	0	0	0	0	0	0	0	0	0	.23
Compound denominate numbers—											
general	3.88	.79	2.25	1.21	1.93	1.47	5.84	2.54	7.08	3.55	30.54
Addition	.72	.30	.46	.76	.82	.17	.24	.37	.33	.95	5.12
Division	.14	.53	.42	.67	1.47	.58	.62	4.04	.56	1.26	10.29
Multiplication	.06	.82	.44	.58	1.09	.98	.31	2.33	.91	.99	8.51
Subtraction	.04	.62	.20	.69	.82	.58	.04	.33	.13	1.52	4.97
Reduction	.35	2.07	1.14	0	0	.78	1.44	0	.99	.95	7.72
Total	5.19	5.13	4.91	3.91	6.13	4.56	8.49	9.61	10.00	9.22	67.15

TABLE I—CONTINUED

Decimals—general	5.55	22.26	4.73	6.86	7.55	19.95	8.92	10.50	30.48	13.13	129.93
Addition	.82	3.66	1.47	1.03	3.68	4.24	3.96	3.13	4.24	4.42	30.65
Division	1.57	5.36	2.57	1.52	6.27	9.27	7.39	10.48	11.93	12.70	69.06
Multiplication	.99	5.10	2.49	3.22	4.33	8.14	6.92	8.06	6.77	8.93	54.95
Subtraction	.41	2.56	.24	.46	1.63	2.48	2.94	2.21	2.77	2.31	18.01
Duo-decimals	0	0	0	0	0	0	0	0	0	0	0
Total	9.34	38.94	11.50	13.09	23.46	44.08	30.13	34.38	56.19	41.49	302.60
Duties and customs	1.18	.46	0	0	.71	0	1.06	0	.61	0	4.02
Federal money	1.46	5.69	2.49	0	2.53	32.92	2.94	21.31	14.62	12.13	96.09
Foreign and domestic exchange	3.79	6.84	16.02	2.37	0	13.46	1.33	1.55	8.88	13.17	67.41
Foreign money	0	.43	0	3.62	0	0	0	0	2.06	0	6.11
Fractions (common)—general	14.52	20.71	12.72	19.29	20.44	30.95	23.70	26.75	43.97	24.25	237.30
Addition	2.12	4.47	4.20	5.22	8.26	15.04	7.06	19.74	7.26	17.91	91.28
Addition and subtraction	1.57	13.28	1.65	3.13	.41	2.34	.88	2.00	8.80	1.97	36.04
Aliquot parts	1.44	0	0	.46	0	0	0	.54	0	0	2.44
Division	2.02	9.34	4.73	5.19	4.77	11.84	7.99	8.08	10.23	17.89	82.08
Multiplication	4.64	8.32	7.79	9.78	4.11	8.58	11.73	11.20	14.51	16.29	96.95
Multiplication and division	0	1.64	.04	0	1.12	.72	1.55	.39	1.37	.65	7.48
Subtraction	1.57	4.08	2.62	2.67	4.80	14.09	8.08	13.59	5.51	16.91	73.90
Complex fractions	0	0	0	.46	.11	1.10	.51	2.31	0	0	4.49
Reduction	3.65	4.21	7.59	5.59	.95	5.49	1.73	1.46	2.94	1.99	35.60
Total	31.53	66.05	41.34	51.79	44.97	90.15	63.23	86.06	94.59	97.86	667.57
Fundamental processes in whole numbers—general	9.55	51.55	33.86	15.04	56.67	67.74	28.25	40.88	80.84	84.53	468.91
Addition	18.36	20.58	19.62	28.52	33.24	42.79	32.77	36.73	33.37	33.40	299.38
Addition and subtraction	0	17.06	4.64	5.71	7.63	10.51	8.12	15.04	35.58	12.96	117.25
Division	18.58	17.88	25.32	29.77	29.89	53.42	29.63	48.26	60.67	58.06	371.48
Multiplication	17.61	16.86	18.08	21.41	20.63	41.18	33.90	42.12	36.44	34.68	282.91

TABLE I—CONTINUED

Topic	50	51	52	53	54	55	56	57	58	59	Total pages
Multiplication and division	.72	10.29	.24	.58	6.68	2.60	4.89	1.03	8.35	3.12	38.50
Subtraction	15.49	9.27	12.43	17.68	21.17	28.12	51.29*	35.25	29.16	22.44	242.30
Total	80.31	143.49	114.19	118.71	175.91	246.36	188.85	219.31	284.41	249.19	1,820.73
Geometry—											
Geometric forms	.10	11.21	.62	5.89	26.59	22.44	3.78	7.67	21.54	45.98	145.82
Area	0	2.93	2.55	2.64	8.80	9.67	3.83	5.82	3.73	14.99	54.96
Volumes	0	1.58	6.97	4.46	11.28	8.43	3.14	7.53	6.88	6.57	56.84
Total	.10	15.72	10.14	12.99	46.67	40.54	10.75	21.02	32.15	67.54	257.62
Imports and exports	0	0	0	0	0	.17	0	0	0	0	.17
Longitude and time	3.16	6.87	3.54	2.10	1.14	14.50	3.61	3.98	17.91	12.99	69.80
Measures, tables, and area	33.16	55.36	48.00	61.90	36.27	128.61	38.05	51.50	107.95	73.88	634.68
Metric system	0	1.74	0	2.16	4.80	0	1.53	2.23	2.56	1.70	16.72
Numeration—											
Notation—general	.52	4.31	7.63	0	7.22	10.08	5.20	1.01	46.51	24.31	106.79
By words and Arabic symbols	4.43	9.83	11.29	15.19	21.47	11.17	8.32	19.53	21.04	9.36	131.63
By Roman numerals	1.88	1.94	1.78	3.04	4.29	3.00	2.10	2.70	3.43	2.71	26.87
Total	6.83	16.08	20.70	18.23	32.98	24.25	15.62	23.24	70.98	36.38	265.29
Partnership—general	.72	0	0	0	0	.29	0	0	0	.75	1.76
Single	0	0	0	0	0	0	0	0	0	0	0
Double	0	0	0	0	0	0	0	0	0	.04	.04
Total	.72	0	0	0	0	.29	0	0	0	.79	1.80
Percentage—general	13.18	35.90	30.27	32.14	28.34	39.59	20.38	31.99	32.07	36.79	300.65
Commission and brokerage	1.40	2.10	.86	.88	1.17	4.22	5.84	1.18	3.20	3.06	23.91

* This figure should be 21.66.

TABLE I—CONTINUED

Discount	3.92	5.03	5.41	8.05	5.56	5.34	8.30	5.18	4.52	7.31	58.62
Insurance	.76	5.46	3.34	3.64	8.20	5.69	5.02	9.26	6.80	6.00	54.17
Interest—general	0	13.12	12.39	16.13	8.37	15.16	12.66	2.87	12.43	6.77	99.90
Compound	.52	2.93	0	0	4.11	2.02	2.01	1.36	1.01	1.54	15.50
Equated payment	0	0	0	0	.65	0	0	0	0	0	.65
Partial payment	0	0	.44	.55	0	.66	.24	0	0	0	1.89
Simple	5.47	0	0	0	2.13	3.00	0	6.97	0	1.13	18.70
Notes	2.85	8.42	0	9.66	4.80	5.02	7.48	2.87	.81	2.09	44.00
Perpetuities and annuities	0	0	0	0	0	0	0	0	0	0	0
Profit and loss	4.76	6.34	12.23	3.43	3.24	10.22	7.81	2.33	7.82	2.01	60.19
Total	32.86	79.30	64.94	74.48	66.57	90.92	69.74	64.01	68.66	66.70	678.13
Powers and roots—general	2.52	2.56	5.72	.16	0	.49	2.59	.54	.91	2.76	18.25
Involution	3.05	0	0	2.37	.44	.58	.09	0	.08	0	6.61
Evolution	3.86	.46	0	2.86	2.07	1.73	.86	1.28	.69	0	13.81
Total	9.43	3.02	5.72	5.39	2.51	2.80	3.54	1.82	1.68	2.76	38.67
Progression—											
Arithmetical	0	0	.46	0	0	0	0	0	0	0	.46
Geometrical	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	.46	0	0	0	0	0	0	0	.46
Properties of numbers	2.72	.62	0	0	.30	0	0	0	1.50	0	5.14
Ratio and proportion	4.95	9.17	3.78	5.25	4.52	5.60	3.72	3.18	7.46	2.13	49.76
Stocks	3.75	3.58	4.40	4.92	3.32	4.88	3.85	4.45	1.85	1.42	36.42
Taxes	1.09	4.44	3.08	6.50	12.51	8.86	5.58	4.54	10.71	6.56	63.87
Miscellaneous problems	15.65	53.65	18.59	64.61	64.34	71.23	47.15	40.57	103.66	153.16	632.61
Other miscellaneous items	0	0	0	5.35	1.47	2.43	0	0	2.26	10.61	22.12
Total 400-word pages	255.31	547.71	385.66	463.87	565.07	853.32	516.33	612.11	935.65	892.40	6,027.43

to 32 major topics and 44 subtopics. Throughout the five parts of this analysis the topics used for study in each period have been the same so far as the content of the books allows. Slight differences in topics are due to changes of content or of emphasis in the textbooks.

In the table, zeroes are used whenever a certain series either omits a topic entirely or treats it only as a phase of some other topic that is included.

According to Table I, all of the books analyzed deal with bills and accounts; compound denominate numbers; decimals; fractions; fundamental processes in whole numbers; geometry; longitude and time; measures, tables, and area; numeration; percentage; powers and roots; ratio and proportion; stocks; taxes; and miscellaneous problems.

Alligation is dropped entirely from the arithmetics of this period, while the *Modern Arithmetic* series, the earliest text included in this period, is the only one to deal with analysis and cancellation. The second 1928 series is the only one including problems concerning imports and exports, and the 1920 series is the only one dealing with progression. Partnership is discussed in only three books, as also is foreign money, although federal money is included in all books except the 1924 series. Foreign and domestic exchange and bonds are also dealt with in all but one book.

It is interesting to note that in this period there is not nearly so much discrepancy among texts as to the topics included. While none of the series covers more than 25 of the 32 major topics, neither does any include fewer than 20. The earliest series and the *Daily Life Arithmetics*, published in 1938, deal with 25 topics each. These are the smallest and the largest of the ten arithmetics analyzed, the *Modern Arithmetic* series containing 255.31 standard pages in only two volumes, and the 1938 series containing 935.65 pages in six volumes. The two series dealing with the fewest topics are the 1920 and the 1937 series.

Throughout the period the arithmetics tend to increase both in number of pages and in number of volumes. This increase is regular in number of volumes and approximately so in number of pages, with the exception of the *Triangle Arithmetics* series in 1928, which has 853.32 standard pages. There is a range of 680.34 pages between the smallest and largest of the series.

In all of the books there are 6,027.43 standard pages, of which fundamental processes in whole numbers account for 1,820.73, or nearly one third of the total. Fractions cover 667.57 pages; measures, tables, and area cover 634.68 pages; percentage covers 678.13 pages; and miscellaneous problems take 632.61 pages. No other major topic is discussed on more than about 300 pages.

Since there is such a wide difference in the length of the different series, it is impossible to get a clear idea of how they compare in their treatment of various topics solely on the basis of the number of pages they devote to those topics. For comparative purposes, therefore, the data given in Table I have been converted into percentages and are presented in Table II. In this way the relative

TABLE II. PER CENT OF 400-WORD PAGES GIVEN TO EACH TOPIC IN ARITHMETIC TEXTBOOKS FROM 1911 TO 1940

Topic	Modern Arithmetic series, 1913	Everyday Arithmetic series, 1915	School Arithmetics series, 1920	Progressive Arithmetics series, 1924	Modern Life Arithmetics series, 1928	Triangle Arithmetics series, 1928	Iroquois Arithmetics series, 1932	Child Life Arithmetics series, 1937	Daily Life Arithmetics series, 1938	Study Arithmetics series, 1940	Total per cent
	50	51	52	53	54	55	56	57	58	59	
Algebra	0	1.03	.23	.25	1.36	.71	1.76	0	1.51	1.08	.90
Aliquot parts	.05	.35	.60	0	.28	0	0	0	0	0	.10
Alligation	0	0	0	0	0	0	0	0	0	0	0
Analysis	1.37	0	0	0	0	0	0	0	0	0	.06
Arithmetic	.16	0	0	0	.12	0	0	.33	1.23	0	.24
Bills and accounts	1.03	3.82	2.25	.86	3.84	2.17	1.30	2.36	.84	2.35	2.10
Bonds	.46	.48	0	.29	.41	.25	.27	.47	.15	.23	.29
Cancellation	.09	0	0	0	0	0	0	0	0	0	.004
Compound denominate numbers—general	1.52	.14	.58	.26	.34	.17	1.13	.41	.76	.40	.51
Addition	.28	.05	.12	.16	.15	.02	.05	.06	.04	.11	.08
Division	.05	.10	.11	.14	.26	.07	.12	.66	.06	.14	.17
Multiplication	.02	.15	.11	.13	.19	.11	.06	.38	.10	.11	.14
Subtraction	.02	.11	.05	.15	.15	.07	.01	.05	.01	.17	.08
Reduction	.14	.38	.30	0	0	.09	.28	0	.11	.11	.13
Total	2.03	.94	1.27	.84	1.08	.53	1.64	1.57	1.07	1.03	1.11

TABLE II—CONTINUED

Topic	50	51	52	53	54	55	56	57	58	59	Tot. per cent
Decimals—general	2.17	4.06	1.23	1.48	1.34	2.34	1.73	1.72	3.26	1.47	2.16
Addition	.32	.67	.38	.22	.65	.50	.77	.51	.45	.50	.51
Division	.61	.98	.67	.33	1.11	1.09	1.43	1.71	1.28	1.42	1.15
Multiplication	.39	.93	.65	.69	.77	.95	1.34	1.32	.72	1.00	.91
Subtraction	.16	.47	.06	.10	.29	.29	.57	.36	.50	.26	.30
Duo-decimals	0	0	0	0	0	0	0	0	0	0	0
Total	3.66	7.11	2.98	2.82	4.15	5.17	5.84	5.62	6.01	4.65	5.02
Duties and customs	.46	.98	0	0	.13	0	.21	0	.07	0	.07
Federal money	.57	1.04	.65	0	.45	3.86	.57	3.48	1.56	1.36	1.59
Foreign and domestic exchange	1.48	1.25	4.15	.51	0	1.58	.26	.25	.95	1.48	1.12
Foreign money	0	.98	0	.78	0	0	0	0	.22	0	.10
Fractions (common)—general	5.69	3.78	3.30	4.16	3.62	3.63	4.59	4.37	4.70	2.72	3.94
Addition	.83	.82	1.09	1.13	1.46	1.76	1.37	3.22	.78	2.01	1.51
Addition and subtraction	.61	2.42	.43	.67	.07	.27	.17	.33	.94	.22	.60
Aliquot parts	.56	0	0	.10	0	0	0	.09	0	0	.04
Division	.79	1.71	1.23	1.12	.84	1.39	1.55	1.32	1.09	2.00	1.36
Multiplication	1.82	1.52	2.02	2.11	.73	1.01	2.27	1.83	1.55	1.83	1.61
Multiplication and division	0	.30	.01	0	.20	.08	.30	.06	.15	.07	.12
Subtraction	.61	.74	.68	.58	.85	1.65	1.56	2.22	.59	1.89	1.23
Complex fractions	0	0	0	.10	.02	.13	.10	.38	0	0	.07
Reduction	1.43	.77	1.97	1.21	.17	.64	.34	.24	.31	.22	.59
Total	12.35	12.06	10.72	11.17	7.96	10.56	12.25	14.06	10.11	10.97	11.08
Fundamental processes in whole numbers—general	3.74	9.41	8.78	3.24	10.03	7.94	5.47	6.68	8.64	9.47	7.78
Addition	7.19	3.76	5.09	6.15	5.88	5.01	6.35	6.00	3.57	3.74	4.97
Addition and subtraction	0	3.11	1.20	1.23	1.35	1.23	1.57	2.46	3.80	1.45	1.95

TABLE II—CONTINUED

Division	7.28	3.26	6.57	6.42	5.29	6.26	5.74	7.88	6.48	6.51	6.16
Multiplication	6.90	3.08	4.69	4.62	3.65	4.83	6.57	6.88	3.89	3.89	4.69
Multiplication and division	.28	1.88	.06	.13	1.18	.30	.95	.17	.89	.35	.64
Subtraction	6.07	1.69	3.22	3.81	3.75	3.30	9.93	5.76	3.12	2.51	4.02
Total	31.46	26.20	29.61	25.60	31.13	28.87	36.58	35.83	30.40	27.92	30.21
Geometry—											
Geometric forms	.04	2.05	.16	1.27	4.71	2.63	.73	1.25	2.30	5.15	2.42
Area	0	.53	.66	.57	1.56	1.13	.74	.95	.40	1.68	.91
Volumes	0	.29	1.81	.96	2.00	.99	.61	1.23	.74	.74	.94
Total	.04	2.87	2.63	2.80	8.26	4.75	2.08	3.43	3.44	7.57	4.27
Imports and exports	0	0	0	0	0	.02	0	0	0	0	.003
Longitude and time	1.24	1.25	.92	.45	.20	1.70	.70	.65	1.91	1.46	1.16
Measures, tables, and area	12.99	10.11	12.45	13.34	6.42	15.07	7.37	8.41	11.54	8.28	10.53
Metric system	0	.32	0	.47	.85	0	.30	.36	.27	.19	.28
Numeration—											
Notation—general	.20	.79	1.98	0	1.28	1.18	1.01	.17	4.97	2.72	1.77
By words and Arabic symbols	1.74	1.79	2.93	3.27	3.80	1.31	1.61	3.19	2.25	1.05	2.18
By Roman numerals	.74	.35	.46	.66	.76	.35	.41	.44	.37	.30	.45
Total	2.68	2.94	5.37	3.93	5.84	2.84	3.03	3.80	7.59	4.08	4.40
Partnership—general	.28	0	0	0	0	.03	0	0	0	.08	.03
Single	0	0	0	0	0	0	0	0	0	0	0
Double	0	0	0	0	0	0	0	0	0	.004	.001
Total	.28	0	0	0	0	.03	0	0	0	.08	.03
Percentage—general	5.16	6.55	7.85	6.93	5.02	4.64	3.95	5.23	3.43	4.12	4.99
Commission and brokerage	.55	.38	.22	.19	.21	.49	1.13	.19	.34	.34	.40

TABLE II—CONTINUED

Topic	50	51	52	53	54	55	56	57	58	59	Tot. per cent
Discount	1.54	.92	1.40	1.74	.98	.63	1.61	.85	.48	.82	.97
Insurance	.30	1.00	.87	.78	1.45	.67	.97	1.51	.73	.67	.90
Interest—general	0	2.40	3.21	3.48	1.48	1.78	2.45	.47	1.33	.76	1.66
Compound	.20	.53	0	0	.73	.24	.39	.22	.11	.17	.26
Equated payment	0	0	0	0	.12	0	0	0	0	0	.01
Partial payment	0	0	.11	.12	0	.08	.05	0	0	0	.03
Simple	2.14	0	0	0	.38	.35	0	1.14	0	.13	.31
Notes	1.12	1.54	0	2.08	.85	.59	1.45	.47	.09	.23	.73
Perpetuities and annuities	0	0	0	0	0	0	0	0	0	0	0
Profit and loss	1.86	1.16	3.17	.74	.57	1.20	1.51	.38	.84	.23	1.00
Total	12.87	14.48	16.83	16.06	11.78	10.67	13.51	10.46	7.34	7.47	11.25
Powers and roots—general	.99	.47	1.48	.03	0	.06	.51	.09	.10	.31	.30
Involution	1.19	0	0	.51	.08	.07	.02	0	.01	0	.11
Evolution	1.51	.08	0	.62	.37	.20	.17	.21	.07	0	.23
Total	3.69	.55	1.48	1.16	.44	.33	.69	.30	.18	.31	.64
Progression—											
Arithmetical	0	0	.12	0	0	0	0	0	0	0	.01
Geometrical	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	.12	0	0	0	0	0	0	0	.01
Properties of numbers	1.07	.11	0	0	.05	0	0	0	.16	0	.09
Ratio and proportion	1.94	1.67	.98	1.13	.80	.66	.72	.52	.80	.24	.83
Stocks	1.47	.65	1.14	1.06	.59	.57	.75	.73	.20	.16	.60
Taxes	.43	.81	.80	1.40	2.21	1.04	1.08	.74	1.14	.74	1.06
Miscellaneous problems	6.13	9.80	4.82	13.93	11.39	8.35	9.13	6.63	11.08	17.16	10.50
Other miscellaneous items	0	0	0	1.15	.26	.28	0	0	.24	1.19	.37
Total per cent	100.00	100.00	100.00	100.00	100.00	100.01	100.04	100.00	100.01	100.00	100.02

emphasis given by each series to a certain topic can be determined—that is, the importance given by the authors to each topic in relation to other topics in the same series or in relation to the same topic in other series.

Here again there is found much more consistency in the textbooks of this period than in those of earlier periods. Bills and accounts, for example, is included in all of the series, and the range is only from .84 to 3.84 per cent of space; compound denominate numbers range from .53 to 2.03; decimals from 2.82 to 7.11; fractions from 7.96 to 14.06; and fundamental processes in whole numbers from 25.60 to 36.58. A wide range in amount of space given is noted in only a few cases. In geometry, for instance, the earliest and smallest of the texts gives the subject only .04 per cent of space while the first 1928 series gives it 8.26 per cent.

A few trends are noticeable, but these are not very significant. Analysis and cancellation are dropped from the texts after 1913. Duties and customs, percentage, powers and roots, ratio and proportion, and stocks lose favor during the 30-year period, but in some cases the amount of space given to the topic at any time during the period is so small as to make the trend uncertain. Decimals, federal money, geometry, numeration, and miscellaneous problems are given more space toward the end of the period than at the beginning.

The order of importance of the 32 major topics, as judged by the amount of space given them by all ten series together, is shown in Table III. As has been said, fundamental processes is given 30.21 per cent (almost one third) of the space in the texts while no other topic is given much more than a tenth. Percentage, fractions, measures, tables, and area, and miscellaneous problems receive about the same emphasis, but no other topic is given as much as half that amount. Eighteen of the 32 major topics are given less than 1 per cent of space and ten are given .10 per cent or less.

Space given to each type of content.—The content of the textbooks in this period has been analyzed from another angle also—that of type of content. As was the case in the analyses of the arithmetics of the other four periods, a certain amount of overlapping is unavoidable when the content is studied from this angle, because problems that can be classified as drill or written problems can also be listed as addition, subtraction, etc. For this reason, the figures given in Table IV add to more than the total number of pages in the books analyzed.

According to Table IV, of the 22 types of content found in the ten series, each series includes at least 17 types, while the 1940 series is the only one containing as many as 20. There is a tendency for the later books to include more different types of content.

Tables and their explanations, examples and their explanations, drill problems without answers, written problems without answers, notes to students, illustrations (both drawings and pictures), and all the fundamental processes are found in all ten series. Definitions and their explanations are found in all except the 1938 series, and rules and their explanations in all except the 1920 series. Only one

TABLE III. MAJOR TOPICS IN ORDER OF SPACE GIVEN TO EACH

Topics	Pages	Per cent
Fundamental processes in whole numbers	1,820.73	30.21
Percentage	678.13	11.25
Fractions	667.57	11.08
Measures, tables, and area	634.68	10.53
Miscellaneous problems	632.61	10.50
Decimals	302.60	5.02
Numeration	265.29	4.40
Geometry	257.62	4.27
Bills and accounts	126.49	2.10
Federal money	96.09	1.59
Longitude and time	69.80	1.16
Foreign and domestic exchange	67.41	1.12
Compound denominate numbers	67.15	1.11
Taxes	63.87	1.06
Algebra	54.25	.90
Ratio and proportion	49.76	.83
Powers and roots	38.67	.64
Stocks	36.42	.60
Other miscellaneous items	22.12	.37
Bonds	17.36	.29
Metric system	16.72	.28
Arithmetic	14.62	.24
Foreign money	6.11	.10
Aliquot parts	5.98	.10
Properties of numbers	5.14	.09
Duties and customs	4.02	.07
Analysis	3.51	.06
Partnership	1.80	.03
Progression	.46	.01
Cancellation	.23	.004
Imports and exports	.17	.003
Alligation	0	0
Total	6,027.43	100.02

book contains written problems with answers, while none of the ten series contains drill problems with answers.

Drill problems with answers do not appear until the 1940 series, introductory material only once (and then only about one fourth of a page) before the second 1928 series, and summary material not before 1932.

As in the other periods of the analysis, the number of pages given each type of content in each series has been translated into terms of percentage for purposes of comparison of the emphasis given by the various authors to each type (Table V).

In all of the series except that published in 1932, written problems without answers are given a greater percentage of space than any other type of content, and in the first six series this type is given two or three times as much space as any other. In every series drill problems without answers and examples and their explanations also rank among the first three in amount of space given to the type of content.

The 1938 series gives introductory material more than twice as much space as do any of the other five books including such material.

TABLE IV. NUMBER OF 400-WORD PAGES GIVEN TO EACH TYPE OF CONTENT IN ARITHMETIC TEXTBOOKS FROM 1911 TO 1940

Type of content	Modern Arithmetic series, 1913	Everyday Arithmetic series, 1915	School Arithmetics series, 1920	Progressive Arithmetics series, 1924	Modern Life Arithmetics series, 1928	Triangle Arithmetics series, 1928	Iroquois Arithmetics series, 1932	Child Life Arithmetics series, 1937	Daily Life Arithmetics series, 1938	Study Arithmetics series, 1940	Total pages
	50	51	52	53	54	55	56	57	58	59	
Definitions and their explanations	5.86	5.13	.46	1.25	2.89	5.89	3.12	1.30	0	8.61	34.51
Tables and their explanations ..	7.01	8.71	10.10	10.39	17.44	36.15	7.32	11.22	23.29	22.93	154.56
Rules and their explanations ..	.80	6.15	0	1.34	10.44	10.08	8.72	11.47	8.27	4.56	61.83
Examples and their explanations	35.56	78.83	78.78	79.73	123.09	88.50	91.86	91.43	169.18	162.50	999.46
Drill problems without answers.	47.73	106.22	79.42	87.72	75.75	199.76	171.49	159.55	194.93	140.74	1,273.31
Drill problems with answers ...	0	0	0	0	0	0	0	0	0	102.30	102.30
Written problems without answers	140.89	289.37	169.71	223.59	187.86	399.31	137.64	248.51	358.42	296.11	2,351.41
Written problems with answers.	0	0	0	0	0	0	0	0	0	0	0
Questions	0	.33	0	1.09	37.80	8.49	6.37	9.38	9.77	24.71	106.94
Notes to students	.14	3.02	1.83	.97	21.58	21.89	15.53	20.07	11.98	27.63	124.64
Notes to teachers	.37	4.18	24.11	34.93	.11	0	0	.85	.03	4.19	68.77
Combined addition	22.02	29.01	25.75	35.53	46.00	62.24	44.03	59.97	45.20	56.68	426.43
Combined subtraction	17.51	16.53	15.49	21.50	28.42	45.27	62.35	51.38	37.57	43.18	339.20
Combined multiplication	23.30	31.10	28.80	34.99	30.16	58.88	52.86	63.71	58.63	60.89	443.32
Combined division	22.31	33.11	33.04	37.15	42.40	75.11	45.63	70.86	83.39	89.91	532.91
Combined addition and subtraction	2.07	30.34	6.29	8.84	8.04	12.85	9.00	17.04	44.38	14.93	153.78
Combined multiplication and division	.72	11.93	.28	.58	7.80	3.32	6.44	1.42	9.72	3.77	45.98
Combined reduction	4.00	6.28	7.73	5.59	.95	6.27	3.17	1.46	3.93	2.94	42.32
Illustrations—drawings	9.90	26.53	8.34	9.57	38.50	30.64	9.73	18.48	40.78	45.98	238.45
Illustrations—pictures	6.21	14.20	7.83	11.03	43.16	30.12	8.30	48.06	71.79	34.80	275.50
Introductory material	0	0	.29	0	0	13.48	.44	1.73	38.72	18.51	73.17
Summary material	0	0	0	0	0	0	.44	0	.74	0	1.18

Notes to teachers are given more space in the 1920 and 1924 series than in any of the others and none of the books after 1924 give as much as .5 per cent to the subject.

Examples and their explanations are given approximately the same percentage of space by all authors, as also are some of the fundamental processes. Division is given more space (8.84 per cent) and subtraction less space (5.36 per cent) than are addition and multiplication, but the differences are not great. The 1938 series gives much more space to addition and subtraction combined than does any other series. The 1932 series stresses the fundamental processes more than do the others and the 1915 series stresses them least.

Illustrations are given about the same amount of space by the first 1928, the 1937, and the 1938 series, this being about twice as much as that given by any other series. The first 1928 series gives more space to drawings and the 1938 series to pictures than do the others, and the 1932 series gives less space to both types of illustrations. Summary material appears in only two series, 1932 and 1938, and each of these devotes only .08 per cent of space to the subject. Questions are omitted entirely from the first and third series and are given 2½ times as much space by the first 1928 series as by the 1940 series, which is next in amount of emphasis given to the subject.

The first 1928 series stresses rules more than do the others, the 1932 series puts more stress on drill, and the 1913 and 1915 series put more on written problems.

Few trends are noticeable. Written problems and notes to teachers receive less emphasis in the later books than in the earlier ones. Notes to students, pictures, introductory material, and possibly drill problems and questions receive more emphasis toward the end of the period.

Analysis of problem subjects.—The content of the arithmetics in the fifth period has been studied also from the point of view of the subjects used in written problems, as were the texts in the other four periods.

In the analysis of problem subjects, the concrete nouns have been noted, as these indicate the range as well as the practicality of subjects. In order that a general idea of the fields in which subjects are used may be gained at a glance, these terms have been classified according to certain large groupings and are listed in Table VI.

The emphasis in the arithmetics of this period seems to be definitely on foods and farm products; almost twice as many problems deal with subjects in this field as deal with subjects in any other classification. Schools and school references are next in importance, with 4,801 mentions, although the vocabulary is somewhat limited (only 80 different nouns) when compared with the vocabulary of some of the other fields. No other subject, however, is mentioned as often as 4,000 times. Both of these fields deal with subjects with which children come in contact every day and with which they are therefore well acquainted. The farm child, especially, would feel himself to be in familiar territory when working the arithmetic problems in these texts.

Alcoholic beverages are included as problem subjects far fewer

TABLE V. PER CENT OF 400-WORD PAGES GIVEN TO EACH TYPE OF CONTENT IN ARITHMETIC TEXTBOOKS FROM 1911 TO 1940

Type of content	Modern Arithmetic series, 1913	Everyday Arithmetic series, 1915	School Arithmetics series, 1920	Progressive Arithmetics series, 1924	Modern Life Arithmetics series, 1928	Triangle Arithmetics series, 1928	Iroquois Arithmetics series, 1932	Child Life Arithmetics series, 1937	Daily Life Arithmetics series, 1938	Study Arithmetics series, 1940	Total per cent
	50	51	52	53	54	55	56	57	58	59	
Definitions and their explanations	2.29	.92	.12	.27	.52	.71	.59	.21	0	.95	.57
Tables and their explanations..	2.73	1.57	2.63	2.29	3.14	4.34	1.39	1.80	2.56	2.52	2.56
Rules and their explanations ..	.31	1.11	0	.29	1.88	1.21	1.66	1.84	.91	.50	1.03
Examples and their explanations	13.87	14.19	20.48	17.54	22.16	10.62	17.45	14.63	18.61	17.87	16.58
Drill problems without answers.	18.61	19.12	20.65	19.30	13.63	23.97	32.58	25.53	21.44	15.77	21.13
Drill problems with answers ..	0	0	0	0	0	0	0	0	0	11.46	1.70
Written problems without answers	54.95	52.09	44.12	49.19	33.81	47.92	26.15	39.76	39.43	32.57	39.01
Written problems with answers .	0	0	0	0	0	0	0	0	0	0	0
Questions	0	.06	0	.24	6.80	1.02	1.21	1.50	1.07	2.72	1.77
Notes to students	.05	.54	.48	.21	3.88	2.63	2.95	3.21	1.32	3.04	2.07
Notes to teachers	.14	.75	6.27	7.68	.02	0	0	.14	.003	.46	1.14
Combined addition	8.62	5.30	6.68	7.66	8.14	7.29	8.53	9.80	4.83	6.35	7.07
Combined subtraction	6.86	3.02	4.02	4.63	5.03	5.31	12.08	8.39	4.02	4.84	5.63
Combined multiplication	9.13	5.68	7.47	7.54	5.34	6.90	10.24	10.41	6.27	6.82	7.36
Combined division	8.74	6.05	8.57	8.01	7.50	8.80	8.84	11.58	8.91	10.08	8.84
Combined addition and subtraction	.81	5.54	1.63	1.91	1.42	1.51	1.74	2.78	4.74	1.67	2.55
Combined multiplication and division	.28	2.18	.07	.13	1.38	.39	1.24	.23	1.04	.42	.76
Combined reduction	1.57	1.15	2.00	1.21	.17	.73	.61	.24	.42	.33	.70
Illustrations—drawings	3.86	4.78	2.17	2.11	6.93	3.68	1.85	2.96	4.49	5.06	3.96
Illustrations—pictures	2.42	2.56	2.04	2.43	7.77	3.61	1.58	7.69	7.90	3.83	4.57
Introductory material	0	0	.08	0	0	1.62	.08	.28	4.26	2.04	1.21
Summary material	0	0	0	0	0	0	.08	0	.08	0	.20

TABLE VI. NUMBER OF WORDS USED IN EACH OF 13 PROBLEM-SUBJECT FIELDS AND TOTAL NUMBER OF TIMES THESE WORDS ARE USED

Classification	Number of words	Times used
Alcoholic beverages	3	22
Animals, birds, fowl, and fish	138	1,825
Building and construction terms and materials	200	3,876
Cloth and clothing	126	2,522
Foods and farm products	263	8,605
Games and recreations	180	2,466
Household equipment	203	1,942
Metals and alloys	24	236
Metal articles	124	826
Military terms and references	38	176
Occupations	195	2,908
Schools and school references	80	4,801
Transportation and travel	87	2,667

times than are items included in any of the other classifications. In all ten series, only three nouns are found dealing with the subject, and these are mentioned only 22 times in all. This situation probably results from the fact that prohibition was enforced during several years of the period and the campaign which led up to it fell within the 30-year period.

Although the first World War took place during this time, only 178 references to military terms and references are made, and these involve the use of only 38 different nouns. Metals and alloys and metal articles are the only other fields in which fewer than 1,800 references are found.

So many different concrete nouns are included in the ten series that space does not permit the listing of all of them. However, all those which are mentioned at least 100 times are included in Table VII. The definite attempt on the part of the authors of these texts to use child psychology in the development of problems shows up clearly in this table. Home, for example, is mentioned 256 times, but only 12 of these times are found in the four texts published before 1928. Cookies are included 123 times, but only about a tenth of these mentions occur in the first half of the 30-year period studied. Father and mother, too, are words which are found 697 and 438 times respectively, but almost half of these mentions appear in the books published during the last four years of the period. A few terms increase in use because they have increased in popularity during the period. For example, airplane is used much more frequently in the later books than in the earlier ones, as also are cars and gasoline.

Some of the farm terms with which the city dweller has little contact lose in popularity as problem subjects during this period. Among these terms are acre, corn, farmer, flour, oats, and wheat. On the other hand, such foods as chickens, eggs, and fish increase greatly in use.

In school terms, blackboards are not used so often in the later books of the period, but this might be accounted for by the fact that they are not always included as part of schoolroom equipment today.

The use of books, pupils, schools, and teacher increases during the period, while that of schoolroom decreases.

An interesting fact in the field of occupations is that dealer, grocer, merchant, and, in fact, most business men, drop off considerably in their use as problem subjects, but money comes into much more frequent use in the more recent books. Here again, the phase of a subject which most closely affects the child is the one used in arithmetic problems in these texts.

A few points worth noting in the use of subjects which occur too infrequently to be included in Table VII are that aircraft carrier and airport are not used until the 1938 series; ice cream cone and factory not until 1928; and garage, library, and radio not until 1924. Country is used as a subject 81 times, but only one of these mentions occurs in the books published before 1924. On the other hand, cannons are not used as problem subjects after 1915, army not after 1920, and carriage not after 1928.

Since the books of the period from 1911 to 1940 have been written and used as texts during the school life of most of the public school teachers of today, the terms used are familiar to all. Then too, vocabulary studies of word difficulties for different grade levels have been used, and an attempt has been made in many of the arithmetics to keep the terms within the grade level of children for whom the texts are designed. For both of these reasons, no listing of unusual or obsolete terms is included in this bulletin. In another hundred years, perhaps, these textbooks will be studied from the point of view of rare or little used words, but at present the vocabulary could be described only as well known and unusually practical.

Sample problems showing subject matter.—The authors of arithmetics of this period make a distinct effort to deal with the everyday experiences of the children in the problems in their texts. The development of an interest in child psychology opened the eyes of textbook writers in many fields to the mistakes they were making in the presentation of material to young learners.

During the period from 1911 to 1940 many changes were made in the general make-up of the books, especially along the line of making the work have more appeal. Pictures and drawings are included, larger margins and more open space are used, and the problems deal with present-day children's activities rather than with the activities they may expect to engage in when they are grown. This does not mean, however, that all the problem subjects deal with playing games, or buying groceries, or taking trips, etc. Family problems, such as the paying of utility bills, budgeting, the buying of materials for building a fence, and so forth are included because the child, as a member of the family, has some contact with such activities. Even though he does not handle such things personally, he realizes the practicality of the arithmetic problems because he has seen such problems arise within the family group.

On the whole, the problems deal with the same general fields as do those in earlier periods. The difference lies in the emphasis given to these various fields and in the level on which they meet the

TABLE VII. FREQUENCY OF MENTION OF THE 86 MOST FREQUENTLY MENTIONED PROBLEM SUBJECTS IN ARITHMETIC TEXTBOOKS FROM 1911 TO 1940

Problem subjects	Modern Arithmetic series, 1913	Everyday Arithmetic series, 1915	School Arithmetics series, 1920	Progressive Arithmetics series, 1924	Modern Life Arithmetics series, 1928	Triangle Arithmetics series, 1928	Iroquois Arithmetics series, 1932	Child Life Arithmetics series, 1937	Daily Life Arithmetics series, 1938	Study Arithmetics series, 1940	Total	Times used by first three	Times used by last three
	50	51	52	53	54	55	56	57	58	59			
Acres	104	28	29	32	17	76	15	11	36	5	353	161	52
Airplanes	0	7	10	10	2	22	3	18	43	30	145	17	91
Apples	71	57	47	38	25	108	45	29	35	66	521	181	130
Automobiles	11	13	54	36	25	61	30	41	40	21	332	78	102
Bags	2	8	9	3	4	21	27	14	30	14	132	19	58
Balls	9	18	11	17	5	17	15	6	12	8	118	38	26
Banks	39	82	59	63	59	83	18	62	45	64	574	180	171
Baskets	2	7	9	6	5	15	21	15	21	9	110	18	45
Bicycles	14	8	7	4	11	32	23	26	26	15	166	29	67
Blackboards	4	27	40	54	1	16	12	6	13	3	176	71	22
Boards	14	36	27	18	7	32	6	5	15	26	186	77	46
Books	45	62	54	43	39	75	39	62	119	91	629	161	272
Bottles	0	11	10	4	13	26	31	13	25	6	139	21	44
Boys	28	93	65	69	38	216	108	95	108	125	945	186	328
Bread	1	11	9	7	10	45	15	3	29	16	146	21	48
Brother	1	12	9	8	20	26	13	29	15	27	160	22	71
Butter	24	32	28	18	13	79	19	14	33	11	271	84	58
Cakes	7	19	7	9	17	9	28	12	34	32	172	33	78
Cans	4	4	31	18	13	31	30	14	36	44	225	39	94
Candy	8	33	11	17	16	54	50	33	58	43	323	52	134
Cheese	3	5	10	9	2	23	10	0	14	5	147	18	19
Chickens	13	10	6	6	11	47	7	18	18	21	157	29	57
Children	8	104	28	24	48	178	56	90	113	139	788	140	342
City	0	61	0	17	36	47	14	16	121	26	338	61	163

TABLE VII—CONTINUED

Classes	0	7	38	48	21	88	41	32	51	12	338	45	95
Clerks	13	27	10	13	5	30	13	27	16	26	180	50	69
Cloth	12	25	49	41	3	57	12	11	29	37	276	86	77
Coal	21	27	40	35	16	61	40	22	56	21	339	88	99
Cookies	1	8	3	1	6	31	10	10	15	38	123	12	63
Corn	91	37	66	35	11	50	12	26	28	29	385	194	83
Cows	19	17	23	11	14	37	4	5	22	17	169	59	44
Dealers	42	27	157	101	6	25	62	28	2	1	451	226	31
Desks	7	20	30	22	16	24	11	9	20	15	174	57	44
Dolls	0	32	11	20	14	17	10	19	19	28	170	43	66
Dresses	2	7	7	8	13	20	18	29	26	29	159	16	84
Eggs	30	38	34	30	41	68	50	42	59	53	445	102	154
Family	1	40	20	13	18	20	17	38	55	54	276	61	147
Farms	34	28	22	15	26	68	22	39	56	46	356	84	141
Farmers	99	25	83	40	14	42	26	16	52	13	410	207	81
Father	0	10	29	35	117	135	50	120	89	112	697	39	321
Fences	10	7	9	3	11	9	2	6	17	26	100	26	49
Fish	2	7	0	0	5	12	11	42	36	9	124	9	87
Floors	10	27	26	5	9	43	6	17	33	27	203	63	77
Flour	15	33	23	31	5	33	13	6	11	15	185	71	32
Gasoline	6	6	7	12	22	33	20	25	43	46	220	19	114
Girls	6	33	42	32	18	78	42	46	52	90	439	81	188
Grocers	12	26	36	19	18	44	20	9	11	2	197	74	22
Hats	13	7	8	7	4	20	13	11	11	14	108	28	36
Horses	56	22	23	21	12	12	3	11	38	15	213	101	64
Homes	0	0	5	7	20	55	12	41	43	73	256	5	157
Houses	29	74	58	54	36	79	51	47	51	61	540	161	159
Land	0	10	30	42	10	34	6	9	27	12	180	40	48
Lots	1	33	39	29	32	17	18	13	18	25	225	73	56
Man	97	110	113	149	34	70	70	33	65	46	787	320	144
Marbles	17	3	20	22	11	19	19	7	23	17	158	40	47
Merchants	52	30	40	26	18	30	21	13	7	10	247	122	30
Milk	33	52	46	44	42	133	55	30	90	65	590	131	185
Money	0	37	39	24	108	118	50	138	112	204	830	76	454

TABLE VII—CONTINUED

Problem subjects	50	51	52	53	54	55	56	57	58	59	Total	First three times	Last three times
Mother	0	8	18	19	63	76	48	74	51	81	438	26	206
Oats	43	17	16	10	10	17	2	9	6	6	136	76	21
Oranges	15	40	46	42	15	55	43	30	17	22	325	101	69
Pencils	19	35	23	20	23	36	27	29	23	18	253	77	70
Pictures	7	22	26	14	13	26	6	20	37	42	207	55	99
Pies	16	2	7	6	19	14	10	6	10	10	100	25	26
Potatoes	36	26	36	22	20	82	27	29	44	29	351	98	102
Pupils	5	32	73	75	24	119	71	73	78	24	574	110	175
Ribbon	23	41	27	30	16	39	36	19	20	19	270	91	58
Roads	9	6	19	13	8	9	4	6	23	12	109	34	41
Rooms	21	22	26	35	14	94	23	29	42	54	360	69	125
Schools	8	56	90	97	51	113	64	93	117	68	757	154	278
Schoolrooms	3	31	21	16	12	38	10	13	12	4	160	55	29
Stores	3	25	36	34	32	40	50	73	45	53	391	64	171
Sugar	18	38	20	24	22	77	32	9	36	32	308	76	77
Suits	14	20	25	19	9	13	18	25	9	7	159	59	41
Tables	9	42	29	8	13	6	5	10	22	22	166	80	54
Tanks	18	2	29	26	11	23	8	14	27	27	185	49	68
Teachers	3	11	15	16	14	15	25	18	17	6	140	29	41
Tickets	1	25	14	9	16	43	36	27	22	32	225	40	81
Towns	0	10	11	2	21	14	9	14	49	13	143	21	76
Trains	24	63	30	27	9	38	21	18	42	33	305	117	93
Trees	37	15	23	14	4	56	25	10	33	40	257	75	83
Walls	11	9	21	19	2	15	4	5	5	12	103	41	22
Water	46	28	66	42	20	58	11	29	75	56	431	140	160
Wheat	57	28	26	16	11	65	5	13	25	6	252	111	44
Windows	6	13	13	12	8	23	10	8	18	28	139	32	54
Wood	23	20	14	9	2	6	0	7	7	15	103	57	29

situation. The subjects are more elementary, less involved, and more often within the realm of the child's experience. A sampling of such problems follows, classified according to approximately the same general headings as have been used for the purpose in the four earlier bulletins.

Agriculture—

A farmer paid $17 for a harrow, $22 for a plow, and $16 for a cultivator. . . .
A farmer fed his horses a bushel of oats 3 times a day. . . .
A farmer bought a sheep for $5. After shearing it, he sold the fleece for $2.50 and the sheep for $4. . . .
If corn fodder loses 60% of its weight in curing, how much will 28 tons of green corn fodder weigh after it is cured?
In a large dairy there are 190 cows. . . .
A farmer took 96 eggs to a store and the dealer bought ⅔ of them. . . .
Ralph's father has 60 hens, but only 75% of them are laying eggs. . . .
The average yield per acre of wheat land the first year was 18.5 bushels. . . .
A farmer had 18 fat hogs. . . .
I have 35 tomato plants in 5 rows. . . .

Business—

A man borrowed $650. He paid $232.50 of the amount at one time and $160 at another. . . .
A coal dealer is selling small lots of coal by the hundredweight instead of by the ton. . . .
One week last month Mr. Fenton's sales were as follows: Damp wash, $108; thrifty service, $62; family finish, $848. . . .
Frank bought a box of crayons for 30 cents and a notebook for 20 cents. . . .
A merchant bought 12 suits of clothes and paid $22 for each suit. . . .
One store offered baseball mitts regularly at $2.00, at 33⅓% off; another store, at ¼ off. . . .
By paying a bill within ten days a merchant was allowed a reduction of 2% of the bill. . . .
A man bought two second-hand automobiles. . . .
A manufacturer sells 100 articles a day at $5 each. . . .
A dealer buys 152 rugs at an average price of $138 each. . . .

Children's occupations—

Harold sells papers after school and on Saturdays. . . .
Clarence earns 20¢ an hour taking care of a neighbor's garden. . . .
Nancy earned her money making Christmas cards. . . .
Fred's father pays him 20¢ an hour for mowing the lawn and picking out the weeds. . . .
Jack and Harold shoveled walks after a snowstorm. . . .
David collected 266 lbs. of old paper and sold it for 27¢ per hundred pounds. . . .
John, Ethel, and Charles picked strawberries for 2¢ a quart. . . .
For doing messenger service Frank received 47¢ on Monday. . . .
Fred sells the Saturday Evening Post at 5¢ each. . . .

Dress—

Mrs. Brown bought herself 1 coat, $25.50; 1 hat, $6.25; 1 dress, $15.75. . . .
Mabel made from muslin and sateen a Russian costume to wear in a play. . . .
For a dress Ida's mother used 4 yards of serge at $1.20 a yard, and the trimming cost $1.90. . . .

Mrs. Thomas bought for $25 a coat which had been marked $40....
If it takes ⅜ of a yard to make a ribbon bow, how many yards will it take to make 5 bows?
A man paid $19.50 for a suit of clothes, $16.75 for an overcoat....
It takes 2⅝ yards of cloth to make a boy's suit. . . .
Kate buys 3 neckties for her brothers, paying 75¢ each. . . .

Education and schools—

Two hundred dollars is spent in equipping a printing room for a school. . . .
In one class there are 24 pupils and in another there are 23. . . .
In a certain school of 43 pupils the teacher's salary is $1100 a year. . . .
The school expenses in a country school for four months were as follows. . . .
A school buys 8 packages of drawing paper and 400 thumb tacks....
In a city-wide spelling contest, 2400 pupils were asked to spell the word yacht. . . .
In a schoolroom there are 7 rows of desks with 5 desks in each row. . . .
If a school is in session 50% of the days of a certain year and is in session 183 days, is that year a leap year or not?

Foods—

About 18% of the weight of potatoes is starch. . . .
If 1 lb. of dried beef yields 790 calories. . . .
If 60 lbs. of sugar cane yielded 36 lbs. of juice and the juice yielded 6 lbs. of sugar. . . .
A family uses 4 quarts of milk each day. . . .
Find the cost of a loaf of plain cake requiring 1 cup sugar at 6¼¢ a pound; ¼ lb. of butter at 32¢ a lb.; 2 eggs at 36¢ a dozen; ½ cup milk at 8¢ a quart; flour at 3¢, baking powder at 1¢, and vanilla at 1½¢. . . .
Three loaves of homemade bread had the food value of 4 baker's loaves bought at 5¢ a loaf. . . .
One basket contains 11 oranges, and another contains 24. . . .
A certain cereal is sold in packages of 1 lb. 10 oz. each. . . .
If a butcher buys meat at 24¢ a lb. . . .

Health and sanitation—

Thirty-six of the 40 pupils brushed their teeth. . . .
The school nurse weighed Mary and Sally. . . .
In some cities a chemical called sodium iodide is added to the water supply twice a year to prevent a certain kind of disease. During a period of three weeks a large eastern city adds sodium iodide to its water supply in the ratio of .0002 gram of sodium iodide to 1 gal. of water. . . .

History—

When the colony at Savannah, Georgia, was started in 1733 all the cabins were 22 feet long and 16 feet wide. . . .
In Rhode Island in 1936 Roosevelt received 165,238 votes. . . .
A lighthouse was built in Genoa about 350 years before Columbus first sailed for America in 1492. . . .
The first ascent in an airship took place in 1903. The first race in 1910. . . .
In 1900 the Indian population of the United States was 237,196; in 1910 it was 265,683. . . .
In 1932 Campbell drove an automobile at Daytona Beach at the average speed of 241.569 kilometers an hour. . . .
In 1830 Chicago was a village of 50 people, living in log houses. In 1930 the population was 3,376,438. . . .

One hundred years ago the fastest ships were the American Clippers. One of these ships sailed from Boston to Liverpool in 12 days. The Santa Maria, in which Columbus made his first voyage to America, took 70 days to cross the Atlantic Ocean. . . .

Human relations—

Isobel is the storekeeper today. Mary wants 8 pieces of candy at 2¢ each. . . .

Some boys in high school rented, at $10 an acre, a piece of land 40 rods long by 20 rods wide, the length running north and south. . . .

If I divide 9 peaches equally among 3 boys, how many peaches will each boy get?

Ralph had 51 marbles. He gave 14 of them to Carl and 9 to Clay. How many marbles had he left?

The class played school today. Kate had a small class. There were 4 girls and 3 boys in class at roll call. How many pupils were there?

While they were playing hide and seek, 2 boys hid behind the barn. Then 3 more boys hid with them. How many boys were hiding behind the barn?

Martha is buying apples from Jennie. If she buys 2¢ worth, and gives Jennie 10¢, how much change should she get?

Miriam bought ¾ dozen small candles for her party. How many candles did she buy?

Will had 19 apples. He gave one to each of his 12 classmates. How many apples had he left?

Industry—

Construction costs were $496,812 for the dam and $375,316 for the powerhouse. Machinery and equipment cost $279,356. What was the total cost?

A factory packs shoes in cases which hold 72 pairs each. How many cases are needed for 3,456 pairs of shoes?

The number of locomotives in service in 1911 was 58,071. By 1925 this number had been increased to 64,150. How many more locomotives were there in 1925 than in 1911?

If a press prints 296 papers a minute, how long will it take to print 20,720 papers?

A machinist wishes to put together two pieces of steel, making an angle ¾ of a right angle. How many degrees are there in this angle?

What is the weight of a steel girder rolled out at a mill, the girder being 20'6" long and weighing 42½ lbs. to the foot?

In a certain blast furnace the casting machine turns out 20 pigs of iron per minute, averaging in weight 110 lbs. each. If this machine runs at this rate for 308 days, 16 hours a day, how many long tons, 2,240 lbs. each, of pig iron will it turn out?

In the month of January a certain factory made 154 rolls of carpet. If the average per month is the same, how many rolls will it make in two years?

Insurance—

Mr. Carter's farm buildings are valued as follows: House, $6,000; barn, $4,500; other buildings, $1,500. These buildings all have approved roofs and are equipped with approved lightning rods. Mr. Carter has decided to insure these buildings for 80% of their value. He will receive a policy for what amount of insurance?

A country store and its contents are insured for 80% of their value at the rate of $ .22 a hundred. The building is valued at $3,000, and its contents at $5,000. Find the premium.

The premium at $1.50 for insuring a stock of goods is $52.50. What is the face of the policy?

A man insured his library for its full value, $2,500 at $1.25. What was the premium? If a fire destroyed ⅗ of the value of the library, how much could he recover?

How much is the annual premium at $102.60 that a man must pay on a 10-year endowment policy, for $4,000? How much would he pay in the 10 years, not considering the loss in interest on the several payments?

A man now pays $75 a year, in advance, for health insurance. Owing to sickness he draws $175 the second year. Allowing 6% interest on his premiums to the end of the second year, how much does he draw in excess of his premiums?

Kitchen problems—

How much does it cost to run an electric waffle iron for 1 hour if the iron uses 500 watts per hour and the current costs 7¢ per kilowatt hour?

Grace's mother can bake 18 small cakes in 1 pan. If she can bake 2 panfuls at the same time, how many little cakes can she bake at the same time?

Mary's mother finds that she is using more sugar than necessary. By being careful she saves 9 lbs. each month. How many pounds does she save in a year?

Mrs. Kane has a recipe for cooking which tells her to use 1 gill of vinegar. What part of a pint does she use?

By the use of a fireless cooker, Mrs. Brown reduced her gas bills for January, February, and March from a total of $8.95 for these months in the previous year to $7.25. At this rate how much will she save if she uses the cooker all the year?

Mary has ½ lb. of sugar. She divides this into 3 equal parts, as her cookbook directs. What part of a pound has she in each part?

A recipe for 6 pop-overs calls for 1 cup of milk, one egg, 1 cup of flour, and 1½ teaspoons of salt. If a woman makes 3 dozen, how much of each ingredient must she take?

If a family needs 5 gallons of sugar sirup, how much is saved by purchasing a 5-gallon can instead of buying ten half-gallon cans?

Note: ½ gal. cans 90¢
5-gal. cans $8

After Mrs. Odell took 13 jars of jam to the country, there were 84 left in the cupboard. How many jars were in the cupboard in the beginning?

Labor and laborers—

Helen's father works 7½ hours each day. If he works 5 days each week, how many hours does he work in 4 weeks?

Tom Glenn's father, who is a laborer in a sawmill, averages 37½ hours of work per week at 48¢ per hour. How much is his average weekly wage?

Mr. Fair earned $1 an hour and worked 40 hours a week. He took a 2 weeks vacation without pay each year. How much did he earn in 1 year?

Mr. Roe is paid 76¢ an hour for an 8-hour day, with "time and a half" for overtime. How much does he receive if he works 9 hours a day for 5 days?

With double pay for overtime, how much should a man receive for a week's work, if he works 44 hours at 30¢ an hour and 4½ hours overtime?

A laborer earned $119 in 28 days. How much did he earn per day?

If a company employs 3,840 men on the same schedule of wages, and

the payroll for these men is $6,336,000 a year, find the monthly wages of each man.

Under a certain contract a boss carpenter paid 27 men $2,193.75 for 13 days of work, all the men receiving the same wages. Find the daily wages of each.

A mason in a certain city receives 90¢ an hour, and a plasterer 72½¢ an hour. How much will 2 masons and four plasterers receive in 8 hours of work?

Living expenses—

Mr. Mason receives a salary of $3,500 a year and allows 20% of this for rent, 60% for living expenses, and 10% for all other expenses. What percent would this leave for savings? How much money is this?

Mrs. Bell bought these groceries: 3 cans of soup at 9¢ a can; 2 lbs. of onions at 5½¢ a lb.; and 5 lbs. of apples at 6¢ per lb. What was her change from a $1.00 bill?

During one month a man spends $80 for rent, $5.74 for electricity, $1.62 for water, and $53.75 for groceries. How much does he spend in all?

The price of a certain grade of coal is $7.75 a ton, $2.00 a quarter of a ton; and 50¢ a bushel (75 lbs. for this grade of coal). The cost of 3 tons is how much less when bought by the ton than when bought by the quarter ton? Than when bought by the bushel?

They bought, for luncheon on the train coming home, 8 sandwiches at 10¢ each, ½ dozen cookies at 18¢ a dozen, and ½ dozen oranges at 90¢ a dozen. How much did the luncheon cost?

If ¼ of a pie costs a nickel, how many nickels will ¾ of a pie cost?

A family spends $702.52 for groceries in 52 weeks. Find the average amount per week.

John paid $19.50 for an overcoat, a hat, and a pair of shoes. The coat cost him $12.50 and the shoes $3.75. How much did the hat cost him?

Military terms—

At Camp Lee the cavalry teams held daily jumping contests. Before August 31, the Whites had won 30 contests out of 40; the Blues, 28 out of 35; and the Browns, 36 out of 50. Which record was the best?

Out of 32 cannons 14 were taken away. How many were left?

Out of a regiment of 2,985 men, 2,247 returned from an engagement. How many failed to return?

If there were 2,860 soldiers in a certain regiment and the government pays 45¢ a day for food for each soldier, what is the cost of the food for the regiment during the month of June?

A battleship was 67% completed. What percent of the work remained to be done?

Morals—

A charitable lady divided 8 pies equally among four families. . . .

A farmer after threshing his wheat had 16 T. of straw left. A ton of this straw contains 12 lbs. of nitrogen, worth 30¢ a lb., and 10 lbs. of potash, and 2 lbs. of phosphoric acid, each worth 5¢ a lb. If the farmer wastes the straw instead of using it on the soil as fertilizer, how much money does he waste?

It is estimated that we have 23,000,000 houses in this country. We are not careful about avoiding waste of such foods as milk. If each home wastes on an average only ⅛ of a cup of milk

a day, and one cup of it equals ½ pt., how many quarts of milk does the country waste per day?

If a farm wagon that cost $90 is left out in the yard instead of being kept in the shed, it will last about 6 years, but if kept under cover, it will last twice as long. How much does a farmer pay for his carelessness per year if he leaves the wagon out?

Beginning on the day he is 16 years old, a boy saves 30¢ a day for 300 days a year and deposits it in a savings bank. Not counting interest, how much will he have in the bank when he becomes 21 years old?

I have $72.95 in the bank and I owe $67.47. If I pay this debt from the money in the bank, how much shall I have left?

Religion and church—

At a church fair $48.30 was taken in the first day, $51.60 the second day, and $89.40 the third day. . . .

At Christmas time a Sunday School ordered 20 lbs. of candy from a candy factory for a party. . . .

Salaries—

If a man's income for 3 days amounts to $172.50, what is his daily income?

A lawyer receives, besides a yearly salary of $1200, fees that average $15 a week. Find his daily income.

A man's salary in a shop was raised ⅛ and then was $2700 a year. . . .

If a man earns $2400 a year and his salary is increased 5%, how much does he now receive?

Science—

A test shows that a Diesel engine used ⅔ gal. of fuel per mile. How many gallons would it use on a 440 mile run?

It takes a little more than 8¼ minutes for the light from the sun to reach the earth. About how far away is the sun?

If the temperature out of doors on a certain day is 40° and the temperature in school is 67°, how much warmer is it in the school than out of doors?

A train travels 105 miles in 3 hours. How many miles will it travel in 4 hours?

If the length of a paddle of a waterwheel in a mill is 3/7 of the diameter and the diameter is 63 inches, what is the length of the paddle?

A steamship changed its longitude 66°44′ in seven days. How many degrees and minutes of longitude did it change per day?

If 1 cu. ft. of copper weighs 8950 oz. and 1 cu. ft. of granite 2780 oz., copper is how many times as heavy as granite?

A cubic foot of water weighs 62.5 lbs. and ice is 0.92 times as heavy as water; . . .

When sound travels 1125 ft. per second, how many miles away is a lightning flash which is seen 13.7 seconds before the thunder is heard?

The sun's diameter is 866,500 miles. Find the surface to the nearest 1000 square miles.

If sound travels 1090 feet in a second, how far does it travel in 30 seconds?

Social life—

To raise money to buy equipment, the Parent-Teacher Association gave an entertainment and sold 765 tickets at 35¢ each and 307 tickets at 15¢. How much money did they get all together from the entertainment?

Of 1496 grown people who went to a school circus, 148 were admitted free. When the ticket-seller checked up, he found that he had $1,011. If each ticket sold for 75¢, was $1,011 the right amount of money?

Henry brought ¾ bu. of walnuts to the party. He divided the nuts into 50 equal shares. Each share was what fraction of 1 bu.?

Those children are going to have a Hallowe'en play in school. Eight boys and six girls are to act in the play. How many children are in the play?

The boy scouts for their hike bought a stewpan at 95¢, a water pail at 45¢, a coffee pot at 75¢, and a ring stand at 40¢. How much did they pay for all those?

Four boys are camping on the shore of a lake and pay $21.48 for the outfit. How much is each boy's share?

Sports—

Charles told his father that he needed these things for football: Padded pants, $1.48; sweater, $2.19; helmet, $ .68; and cleats on shoes, $ .45. How much will all these cost?

The winner of a cross-country run started at 10:13 A.M. His time for the race was 38 minutes. At what time did he finish?

A school team played a full 9 inning game of baseball in 144 minutes. Find the average time of an inning.

It is 660 ft. around a running track. After a boy has run 584 ft., how much farther must he run to go all the way around the track?

At an athletic meet 860 spectators bought tickets at 45¢ each and 1,240 at 25¢ each. . . .

In a relay race the first boy of one team ran his lap in 14 4/5 seconds, the second boy in 13 3/5 seconds, the third in 14 3/5 seconds, and the fourth in 13 4/5 seconds. What was the total time of the race?

How many baseball teams can be made from 42 players?

Travel—

Jack and his parents made an automobile trip of 1,547 miles. It took them 7 days. What was the average distance covered in one day?

Kate's father took her to the city. Their railroad tickets cost $3.36. They paid 60¢ for street-car fares and $1.50 for luncheon. They paid 90¢ for a cab to make a call. . . .

If Mr. Davis drives from Chicago to Milwaukee, a distance of 90 miles, and uses a gallon of gasoline every 15 miles, how many gallons does he use on the trip?

An express train made a run of 504 miles in 12 hours. What was the average rate per hour?

If you are taking a railway journey of 180 miles, what part of it have you finished when you have gone 60 miles?

If a boy rides 54 miles on his bicycle in 6 hours, at what rate per hour is he traveling?

From New York to Chicago by way of Cleveland over the New York Central Railway is 978 miles. . . .

As might be expected, by far the largest number of problems fall into such classifications as agriculture, foods, business, insurance, human relations, kitchen problems, labor and laborers, living expenses, dress, science, social life, sports, and travel. Agriculture, food, living expenses, dress, and travel have always been suitable and useful subjects for arithmetic problems. In the attempt of writers to meet more nearly the experiences of the children, human relations, kitchen

problems (which often deal with food), social life, and sports are used frequently in the problems. Business, insurance, and labor and laborers are more popular as subjects in this period than in earlier periods. This might be accounted for by the increase in general interest in these fields. Children are becoming better and better acquainted with facts in elementary science, and these textbooks have taken advantage of their knowledge and interest in the field by using scientific facts as bases for many of their problems.

In spite of their attempt to meet children's interests in the selection of subjects for their problems, these texts do not contain much written work dealing with children's occupations, education and schools, or health and sanitation. History, industry, military facts, and salaries are used very seldom. There are a number of problems dealing with what might be called morals, that is, questions which bring out the subjects of good management, care of equipment, loss by waste, honesty, savings, and charity. Technically, these subjects might not be classed as morals, but they have a definite teaching value in the field of good citizenship. References to religion and the church have almost dropped out of the arithmetics of the period. Almost no references are made to the subject, and these few deal with the social life of the church rather than with the religious side.

In all ten series very few instances are found of absurd statements. An attempt has evidently been made to make the problems as realistic as possible. For the most part prices are normal for the times, measurements are practical, quantities are kept within the experience of the average individual, and statistical information, wherever used, is true to fact. Only a few instances are found in which the figures used are inconsistent with actual conditions. One of these few cases is found in the problem "A battleship carried 4,614 sailors and 227 officers. How many men were on the ship?" Since even the large new battleships built since the beginning of the second World War carry only about 2,000 sailors and 125 officers, and a few years ago battleships carried only about 1,400 men and 100 officers, the figures in this problem are ridiculously high.

Distances and speeds of automobile travel vary considerably through the texts of the period, but these differences are due to the tremendous increase in speed of such travel between 1911 and 1940. In almost every case the rate per hour given in a problem is in keeping with the average automobile speed at the time the book was written.

Almost no impractical problems are included. One of the few instances found is in the problem "18 boys decided to raise money for purchasing baseball supplies. Each gave ⅜ of a dollar. How much money did they raise?" According to this problem each boy would of course give 37½ cents, an amount which could not be paid exactly in American coins.

For the first time in many years of publication of arithmetics, puzzle problems are found in a textbook studied in this analysis. The *Daily Life Arithmetics* series contains a page of puzzle problems and two pages of optical illusions. These are presented from an educational and interest point of view, however, rather than from a desire to

confuse the student and in this way to check on his ability to think clearly.

SUMMARY AND GENERAL CONCLUSIONS

In this bulletin the representative arithmetics published during the fifth period of the analysis (1911-1940) are studied. For the first time in any of the texts analyzed is found an attempt to divide material according to specific grade levels and to present it in a form consistent with learning principles. Child psychology is used as a basis for both the form and the content of the texts.

Every one of the series is made up of more than one volume, the number varying from two to six, with each volume prepared for different grade levels. The number of books in a series increases steadily from two in the first series to six in each of the last three series.

The number of standard 400-word pages in a series also increases almost steadily from the first series (255.31 pages) in the period to the last (892.40 pages).

Many illustrations are used in all series, and especially in the first 1928, the 1937, and the 1938 series. In some cases these are used for the sake of clarifying a process in arithmetic, such as a sketch of nine sticks divided into three groups of three each to illustrate simple fundamental processes. In other cases the drawings or photographs are used to create interest and to make the book more attractive.

Games and play are used in most of the books to enliven the subject of arithmetic. Much drill in the fundamental processes, especially, can be given to children rather painlessly in this way.

The size of the typed page varies somewhat, but in all series it is approximately 4 by 6 inches. Margins are fairly wide, and much blank space is left between topics, which gives the book the appearance of being light and easy to read.

The bindings of the three earliest series in the period are brown or grey, but later texts are bound in brighter covers—red, blue, and so forth. Each of the six books in the *Daily Life Arithmetics* series, published in 1938, is bound in a different color, but this is the only series studied in this period which used more than one color. The last series, again, is bound in brown, but the covers are made attractive through the use of pictures—a different one on each volume.

Throughout the period an attempt is made to use simple language and sentence structure and to deal adequately with each new topic, so that children can thoroughly understand one process before undertaking to learn the next.

When the ten arithmetics are analyzed according to 32 major topics and 44 subtopics, it is found that every one of the series includes the topics of bills and accounts; compound denominate numbers; decimals; fractions; fundamental processes in whole numbers; geometry; longitude and time; measures, tables, and area; numeration; percentage; powers and roots; ratio and proportion; stocks; taxes; and miscellaneous problems. None of the texts includes alligation, and only the

series published in 1913 deals with analysis and cancellation. Imports and exports and progression are also found in only one of the texts.

On the whole there is surprising uniformity in the topics included and in the amount of space given each in the ten series. Each one of the series contains from 20 to 25 of the 32 major topics. Trends are uncertain in most cases because of the small number of pages given to many of the topics.

Fundamental processes in whole numbers are given 30.21 per cent of space by all books combined, while no other topic is given much more than 10 per cent. Ten of the topics are each given as little as .10 per cent of space or less.

Of the 22 types of content found in the arithmetics of this period, each series contains from 17 to 20. Every one of the series contains tables and their explanations, examples and their explanations, drill problems without answers, written problems without answers, notes to students, illustrations (both drawings and photographs), and all the fundamental processes. The 1914 series is the only one including drill problems with answers, and none of the series contains written problems with answers. In all of the series except one, written problems without answers receive a greater percentage of space than does any other type of content.

In subject matter the emphasis in the arithmetics of this period seems to be definitely on foods and farm products; no other subject is used much more than half as many times. The subject of schools and school references is the next most frequently used problem subject.

Since prohibition was enforced during several years of this period, it is not surprising that alcoholic beverages are mentioned only 22 times in all ten texts combined.

The emphasis being placed on keeping the vocabulary of textbooks on the grade level of the child and within his experience is noticeable in the greatly increased use of such words as home, cookies, father, and mother.

The trend of the times in the use of new words and the dropping of others is, of course, noticeable in the texts. Airplanes, cars, and gasoline increase greatly in use during the period, while such words as carriage decrease in popularity.

No rare or obsolete words are found in the texts. This does not give evidence, however, that the vocabulary of these books is any more practical and up-to-date than that of arithmetics published in the earlier periods of this analysis. It means only that the vocabulary of the texts is familiar to the people of today not only because the authors attempted to use well-known terms but also because the books have been written by persons living in the present generation.

Vocabulary is not the only phase of textbook writing that has been affected by an attempt on the part of the authors to suit their texts to the age level of the child for whom they are designed. The subject matter of the problems also deals with activities of interest to children, such as playing games, taking trips, and so forth. The problems are, for the most part, clear and simply expressed. Many deal with foods, business, human relations, household problems, living

expenses, travel, and scientific facts. Almost no references are found to religion and church, and very few to education, health, history, industry, and military facts.

Almost no problems are included which are absurd or impractical or which contain statements that are not true to fact.

On the whole, the authors of arithmetics published during the last 30-year period seem to have attained their goal of writing arithmetics which present the subject clearly, simply, and interestingly.

A List of Bulletins in the Field of Education, Indiana University

By Kathleen Dugdale

The School of Education at Indiana University has published the following bulletins. All of these may be obtained from the University Bookstore for 50 cents postpaid unless otherwise noted.

Proceedings of the High School Principals' Conference (November 23 and 24, 1923). Vol. I, No. 1, 1924. 85 p. (Supply exhausted.)

Investigation of Nursing as a Professional Opportunity for Girls, Part I, Technical Study; Part II, Vocational Information Bulletin. By Florence E. Blazier. Vol. I, No. 2, 1924. 69 p.

Proceedings of the Eleventh Conference on Educational Measurements. Vol. I, No. 3, 1925. 141 p.

Proceedings of the High School Principals' Conference (November 14 and 15, 1924). Vol. I, No. 4, 1925. 49 p. (Supply exhausted.)

First Revision of the Bibliography of Educational Measurements. Compiled by the Bureau of Cooperative Research. Vol. I, No. 5, 1925. 147 p. (Supply exhausted.)

Proceedings of the Twelfth Conference on Educational Measurements. Vol. I, No. 6, 1925. 76 p.

The Effect of Population upon Ability to Support Education. By Harold F. Clark. Vol. II, No. 1, 1925. 28 p.

Proceedings of the High School Principals' Conference (November 20 and 21, 1925). Vol. II, No. 2, 1925. 77 p. (Supply exhausted.)

A Cross-Indexed Bibliography on School Budgets. By Harold F. Clark. Vol. II, No. 3, 1926. 66 p.

A Comparison of the Results Made on Certain Standardized Tests by Pupils in the Bloomington High School Who Were Taught in Classes of the Same Grade by University Student Teachers and by Regular High School Teachers. By Carl G. F. Franzén. Vol. II, No. 4, 1926. 19 p.

Proceedings of the Thirteenth Annual Conference on Educational Measurements. Vol. II, No. 5, 1926. 103 p.

When to Issue School Bonds. By Harold Florian Clark and Paul Royalty. Vol. II, No. 6, 1926. 16 p.

Students' Attitude Toward Examinations. By Grover T. Somers. Vol. III, No. 1, 1926. 48 p.

Proceedings of the High School Principals' Conference (November 12 and 13, 1926). Vol. III, No. 2, 1926. 27 p.

Index Numbers in School Administration. By Harold F. Clark. Vol. III, No. 3, 1927. 35 p.

Topical Analysis of 234 School Surveys. Compiled by the Bureau of Cooperative Research. Vol. III, No. 4, 1927. 111 p. (Supply exhausted.)

Proceedings of the Fourth Annual Conference on Elementary Supervision. Vol. III, No. 5, 1927. 64 p.

Proceedings of the Fourteenth Annual Conference on Educational Measurements. Vol. III, No. 6, 1927. 66 p.

Some Phases of the Junior College Movement. By I. Owen Foster, Harold F. Clark, Willard W. Patty, and Leo M. Chamberlain. Vol. IV, No. 1, 1927. 125 p. (Supply exhausted.)

Second Revision of the Bibliography of Educational Measurements. By Henry Lester Smith and Wendell William Wright. Vol. IV, No. 2, 1927. 251 p. (75¢)

Bibliography of School Buildings, Grounds, and Equipment, Part I. By Henry Lester Smith and Leo Martin Chamberlain. Vol. IV, No. 3, 1928. 326 p. (75¢)

Proceedings of the High School Principals' Conference (November 18 and 19, 1927). Vol. IV, No. 4, 1928. 54 p.

The Economic Effects of Education. By Harold F. Clark. Vol. IV, No. 5, 1928. 39 p.

Proceedings of the Fifteenth Annual Conference on Educational Measurements. Vol. IV, No. 6, 1928. 73 p.

Proceedings of the Fifth Annual Conference on Elementary Supervision. Vol. V, No. 1, 1928. 54 p.

Proceedings of the High School Principals' Conference (November 16 and 17, 1928). Vol. V, No. 2, 1928. 33 p.

The Development and Use of a Composite Achievement Test. By Wendell William Wright. Vol. V, No. 3, 1929. 90 p.

An Analysis of the Attitudes of American Educators and Others Toward a Program of Education for World Friendship and Understanding. By Henry Lester Smith and Leo Martin Chamberlain. Vol. V, No. 4, 1929. 109 p.

Tentative Program for Teaching World Friendship and Understanding in Teacher Training Institutions and in Public Schools for Children Who Range from Six to Fourteen Years of Age. By Henry Lester Smith and Sherman Gideon Crayton. Vol. V, No. 5, 1929. 54 p.

Proceedings of the Sixteenth Annual Conference on Educational Measurements. Vol. V, No. 6, 1929. 96 p.

Proceedings of the Sixth Annual Conference on Elementary Supervision. Vol. VI, No. 1, 1929. 73 p.

An Analysis of the Duties of County School Superintendents and Superintendents of Schools in Certain Cities in Indiana. By Henry Lester Smith and Leo Martin Chamberlain. Vol. VI, No. 2, 1929. 94 p.

Proceedings of the High School Principals' Conference (November 22 and 23, 1929). Vol. VI, No. 3, 1930. 51 p.

Cooperative Studies in Secondary Education. By Henry Lester Smith and Carl G. F. Franzén. Vol. VI, No. 4, 1930. 121 p.

Proceedings of the Seventeenth Annual Conference on Educational Measurements. Vol. VI, No. 5, 1930. 103 p.

Proceedings of the Seventh Annual Conference on Elementary Supervision. Vol. VI, No. 6, 1930. 102 p.

A Study in Teacher Supply and Demand in Indiana. By I. Owen Foster, Robert K. Devricks, Harry N. Fitch, Earl C. Bowman, and George L. Roberts. Vol. VII, No. 1, 1930. 77 p.

Proceedings of the High School Principals' Conference (November 7 and 8, 1930). Vol. VII, No. 2, 1930. 70 p.

The Philosophy of Human Relations: Individual and Collective—A Source Book. By Henry Lester Smith and Harold Littell. Vol. VII, No. 3, 1931. 326 p. (75¢)

The Psychology of Human Relationships: Individual and Social—A Source Book. By Henry Lester Smith and Levi McKinley Krueger. Vol. VII, No. 4, 1931. 107 p.

Proceedings of the Eighteenth Annual Conference on Educational Measurements. Vol. VII, No. 5, 1931. 83 p.

Efficiency in College Management. By John Dale Russell. Vol. VII, No. 6, 1931. 143 p.

Bibliography of School Surveys and of References on School Surveys. By Henry Lester Smith and Edgar Alvin O'Dell. Vol. VIII, Nos. 1 and 2, 1931. 212 p. (75¢)

Proceedings of the Nineteenth Annual Conference on Educational Measurements. Vol. IX, No. 1, 1932. 139 p.

Bibliography of School Buildings, Grounds, and Equipment—Part II. By Henry Lester Smith and Forest Ruby Noffsinger. Vol. IX, No. 2, 1933. 182 p.

Bibliography of School Buildings, Grounds, and Equipment—Part III. By Henry Lester Smith and Forest Ruby Noffsinger. Vol. IX, No. 3, 1933. 130 p.

A Brief Summary of Literature on Leadership. By Henry Lester Smith and Levi McKinley Krueger. Vol. IX, No. 4, 1933. 80 p.

Proceedings of the Twentieth Annual Conference on Educational Measurements. Vol. X, No. 1, 1933. 98 p.

Bibliography of College and University Buildings, Grounds, and Equipment. By Henry Lester Smith and Forest Ruby Noffsinger. Vol. X, No. 2, 1934. 199 p. (75¢)

Factors Affecting the Organization of School Attendance Units. By Raleigh Warren Holmstedt. Vol. X, No. 3, 1934. 32 p.

The Old World Historical Background of Religious and Moral Education in Schools. By Henry Lester Smith, Robert Stewart McElhinney, and George Renwick Steele. Vol. X, No. 4, 1934. 144 p.

Proceedings of the Twenty-first Annual Conference on Educational Measurements. Vol. XI, No. 1, 1934. 96 p.

Bibliography of School Buildings, Grounds, and Equipment—Part IV. By Henry Lester Smith and Forest Ruby Noffsinger. Vol. XI, No. 2, 1935. 216 p.

A Brief Survey of Present-Day Religious and Moral Education in the Schools of Countries Other Than the United States of America. By Henry Lester Smith, Robert Stewart McElhinney, and George Renwick Steele. Vol. XI, No. 3, 1935. 185 p.

Some Practical Efforts to Teach Good Will. By Henry Lester Smith and Peyton Henry Canary. Vol. XI, No. 4, 1935. 169 p.

Proceedings of the Twenty-second Annual Conference on Educational Measurements. Vol. XII, No. 1, 1935. 97 p.

A Basis for the Improvement of Education in Rural Monroe County, Indiana. By Henry Lester Smith and Forest Ruby Noffsinger. Vol. XII, No. 2, 1936. 168 p.

Reading Readiness—A Prognostic Study. By Wendell William Wright. Vol. XII, No. 3, 1936. 46 p.

Proceedings of the Twenty-third Annual Conference on Educational Measurements. Vol. XII, No. 4, 1936. 60 p.

Bibliography of Literature on the Teaching of English. By Henry Lester Smith and William Isaac Painter. Vol. XIII, No. 1, 1936. 299 p.

Bibliography of Literature on Education in Countries Other Than the United States of America. By Henry Lester Smith and William Isaac Painter. Vol. XIII, No. 2, 1937. 341 p. (75¢)

Character Development Through Religious and Moral Education in the Public Schools of the United States. By Henry Lester Smith, Robert Stewart McElhinney, and George Renwick Steele. Vol. XIII, No. 3, 1937. 137 p.

Proceedings of the Twenty-fourth Annual Conference on Educational Measurements. Vol. XIII, No. 4, 1937. 100 p.

Bibliography of Literature on Education in Countries Other Than the United States of America (January 1, 1919, to December 31, 1924). By Henry Lester Smith and William Isaac Painter. Vol. XIV, No. 1, 1937. 139 p.

Two Studies in Education. By Henry Lester Smith and Merrill Thomas Eaton. Vol. XIV, No. 2, 1938. 42 p.

Bibliography of School Surveys and of References on School Surveys (Supplement to Vol. VIII, Nos. 1 and 2). By Henry Lester Smith and Edgar Alvin O'Dell. Vol. XIV, No. 3, 1938. 144 p. (75¢)

Proceedings of the Twenty-fifth Annual Conference on Educational Measurements. Vol. XIV, No. 4, 1938. 37 p.

Remedial Instruction in Reading with College Freshmen. By Nila Banton Smith. Vol. XV, No. 1, 1938. 35 p.

Two Studies in Arithmetic. By Henry Lester Smith and Merrill Thomas Eaton. Vol. XV, No. 2, 1939. 91 p.

The Relation of Retention to Speed of Learning. By Henry Lester Smith and Merrill T. Eaton. Vol. XV, No. 3, 1939. 105 p.

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An Experimental Study of Standards for the Selection of Candidates for Teacher-Training Institutions. By Henry Lester Smith and Merrill Thomas Eaton. Vol. XVI, No. 1, 1939. 72 p.

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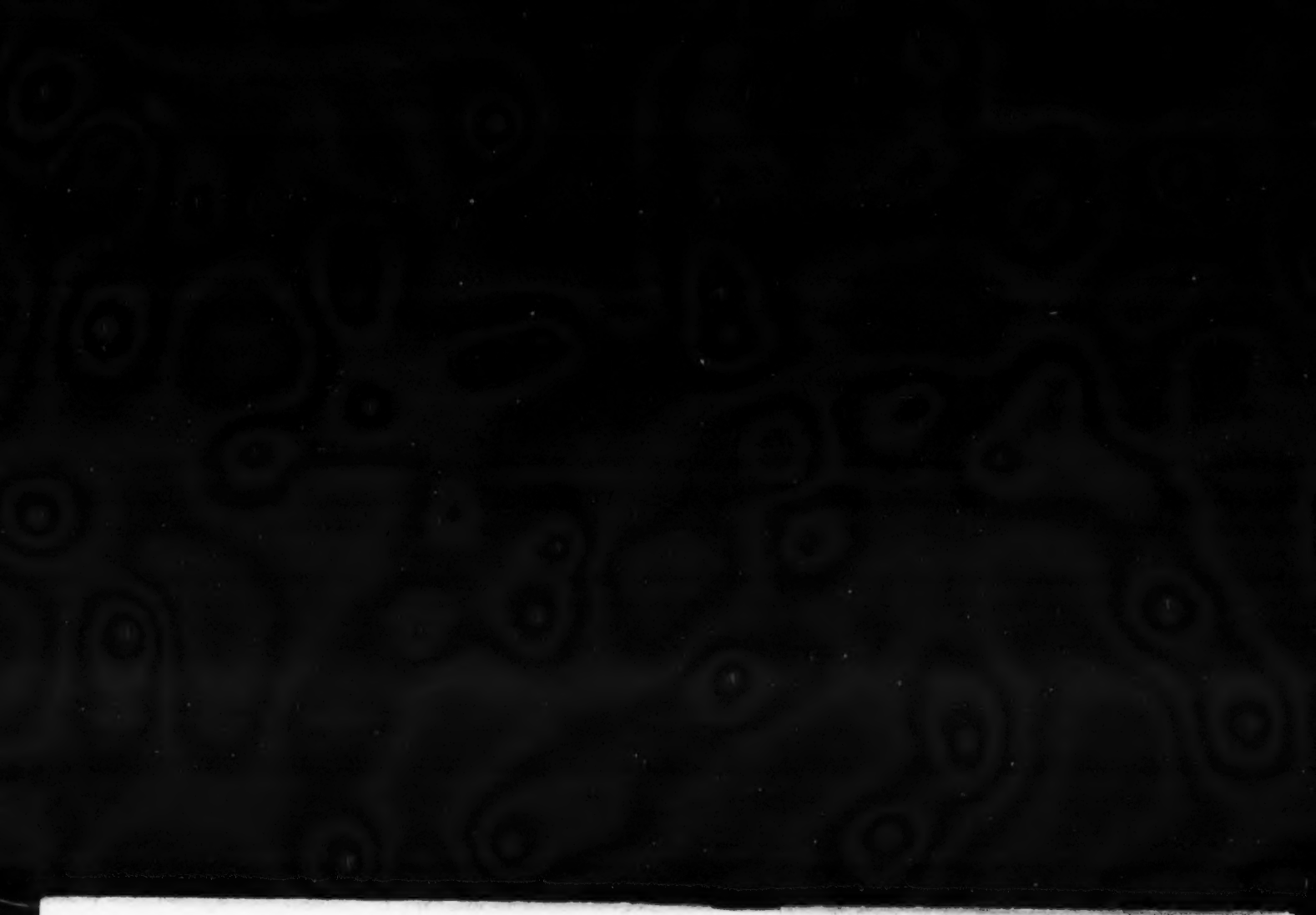
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